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Amateur Television

Quarterly



See you at the
Dayton Hamvention
Booth 207

Dayton Hamvention ATV & SSTV Activities

North American ATV DX Report

Amateur Television Contest 2007

GVM-1 Board Application

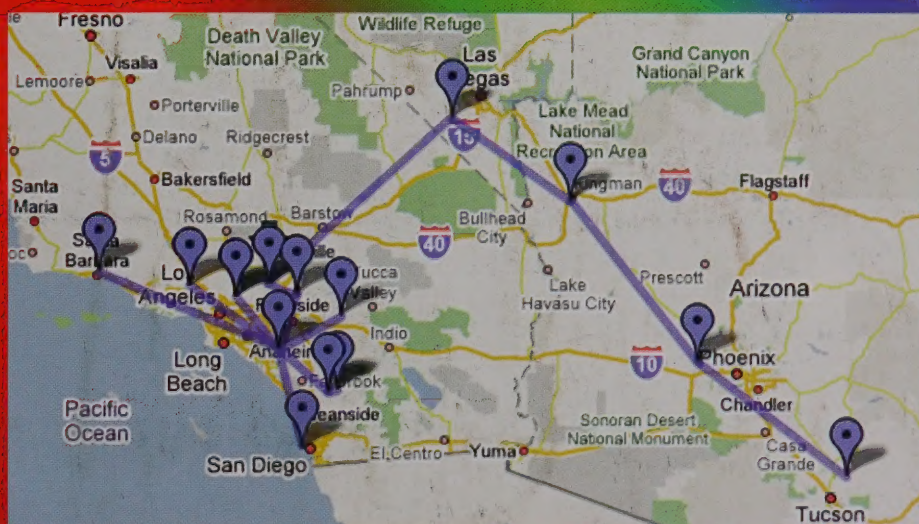
Near Space Ballooning
And More !



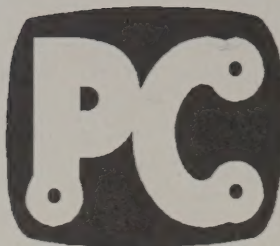
ATV in Tucson, AZ
High School



What to do with that camcorder
with a broken tape deck



Linking ATV Repeaters - Here is how it is done
1. Grow a mountain..... and/or read the article



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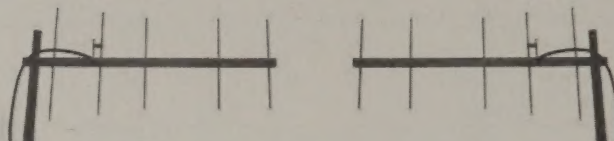
Antennas, R/C, Balloons, Rockets, ARES/RACES application notes, repeater design, DX and more

Emergency Comm One Way ATV link Snow Free 7 miles line of sight to the EOC



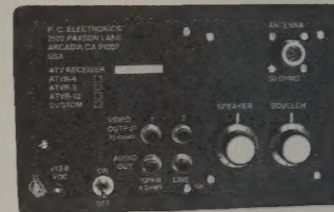
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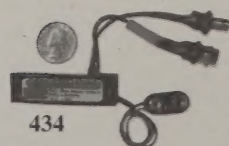
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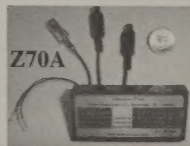
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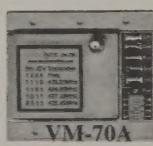
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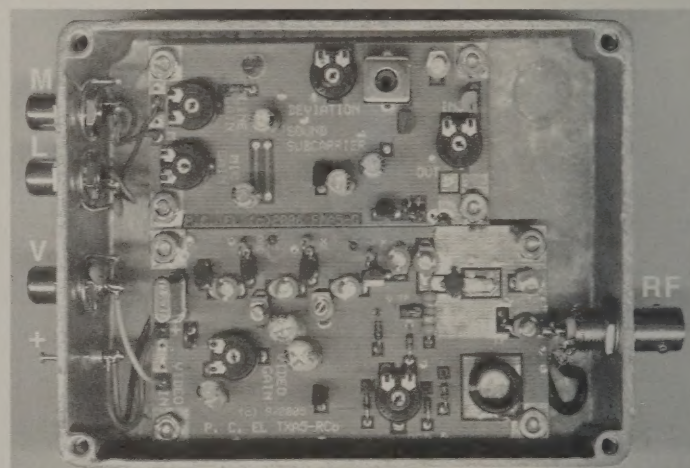
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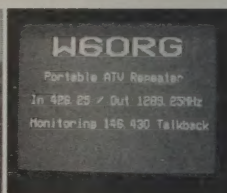
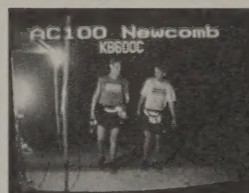
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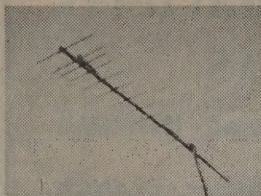
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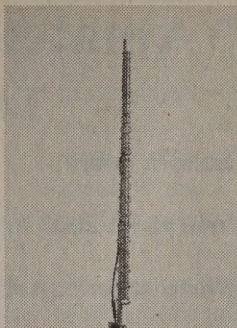
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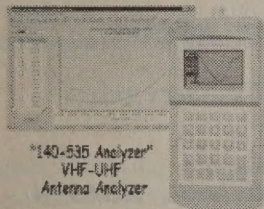
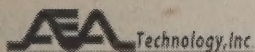
On-Screen ID Overlay



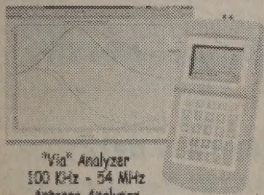
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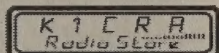
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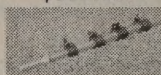


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Editor Notes

It does not seem like it is time for the Dayton Hamvention again, but it is close. Chris from Intuitive Circuits is planning to be with us this year in booth 207. Make sure you stop by and visit as he has not been there for a couple of years.

I will be a small part of the Saturday ATV Forum, talking about ATV & Emergency Communications - The Possibilities. ATV should be a lot bigger than it is (my opinion, of course) and using ATV for emergencies may be a way to get this mode used more. Those of us that use it now know that it is not that hard, but I have the impression that many think it is.

My main hope is just to get people thinking about how ATV could be used. The obvious thing would be to have a mobile ATV unit to get pictures of a disaster back to the EOC or hospital. The reason that our repeater here in Rockford, IL is on top of the hospital is because I had made a PowerPoint presentation that showed various possibilities of how we might be able to help when needed.

A couple of years ago, a few members of our group were invited

to put on a 45 minute talk to a Midwest convention held here for paramedics, police, fire, hospitals and other emergency groups. I was amazed at how many that listened to us came up afterwards to say something like "You mean that when XXX happened, we could have put a ham in a helicopter and been able to see what was happening?" But, and a big BUT, we have to be prepared ahead of time to do this. While it does not have to be hard, it is not like picking up a handi-talkie and walking out the door.

So, prepare yourself first getting equipment up and working, whether it be just your equipment at home, portable equipment or an ATV repeater. Then let, or better yet 'SHOW' the people at the EOC what can be done and how easy it is. Get the EOC set up with a receiver so they will be ready to monitor the local repeaters or your direct signal if possible.

And practice driving your model cars (with cameras on the models of course). You never know when that might be a useful tool.

I could go on, but then you might not come to listen at the Dayton ATV forum. See you there!

Gene - WB9MMM

ATVQ

Interradio 2006 in Hannover

A special showing at the traditional "Interradio 2006" was called "Amateur Radio In Changing Times". OM from Braunschweig displayed rare exhibits from amateur radio and broadcasting.

One piece was an extension to a fritter receiver shown in 2004 already, and with a homemade nipkow disc receiver the first video transmission device with 30 lines showed pictures from a CD-ROM. Of course AGAF again had a stand on the fair ground.

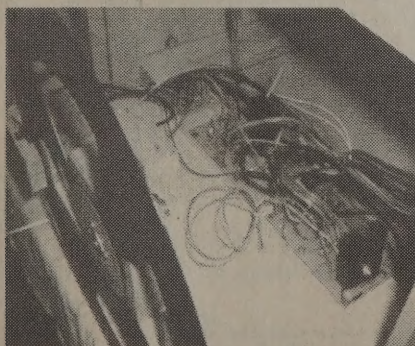
A simple reproduction of Baird's "Televisor" is offered on the web at www.mutr.co.uk. The Middlesex University has developed many kits, tools and teaching packs supporting design and technology teachers during times of very rapid change. The



Our booth at Interradio

small battery powered "Televisor" kit comes with modern ICs, an LED and a CD containing historical and modern NBTV footage, but also explaining text on mechanical TV principles. For assembly only a screw driver is needed, costs are about 30 pounds. Basis of the 30 line model in a third of the original size are circuit designs by members of the NBTVA "Narrow Bandwidth TV Association" www.nbtv.org

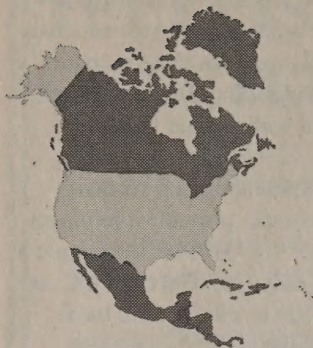
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Fotos: DJ7RI

North American ATV DX Report

By: Bob Delaney - KA9UVY - Email KA9UVY@hotmail.com
10630 N. Delaney Lane
Mt. Vernon, IL 62864
DX Hotline 618-242-7063



Where is all the DX??

Well the short answer is gone! I haven't been this depressed over a band since the Beatles broke up. The proper answer would be: On the way soon!

The winter months are usually very poor for Tropospheric Ducting in the Midwest and this winter was no exception. Conditions are expected to improve gradually and the Gulf states should be enjoying some openings as I write this. The Midwest will still have to endure another month of poor or spotty band conditions but if the spring comes early the DX will surely follow **SO HANG IN THERE !**

Since there were no reports of DX to cover this time I will take a look at DX'ings future and past in this column.

OMAHA ATV DXER?

One of the bright spots this winter for me was seeing a new station on the logger from Omaha, NE. As you know there has not been a DX target or for that matter any ATV activity out of there for quite a while. Warren, NØWF, has started the old ATV bug up there again. We have talked on the phone and he seems interested in DX'ing. He even said if the band is open to Omaha, he would love to try and work me for state #15. Sounded good to me :)

Warren also has a few others dusting off their gear and looking to get back on so there may be hope for many of us to make a DX contact with Nebraska this year.

Keep an eye on the ATV Activity Logger for Warren and others in Omaha.

OKLAHOMA ACTIVITY / NEW OPERATOR

There seems to be some new interest in the Oklahoma City area and Scott, KCØOW, of Guthrie, OK sent me an email with a screen capture of him coming in at NO5X, in Midwest City, OK. Not a great distance at 25 miles but it's a start and you can see that Scott is on the right track with the huge black on white DX slide! Scott also asked to be added to the National ATV



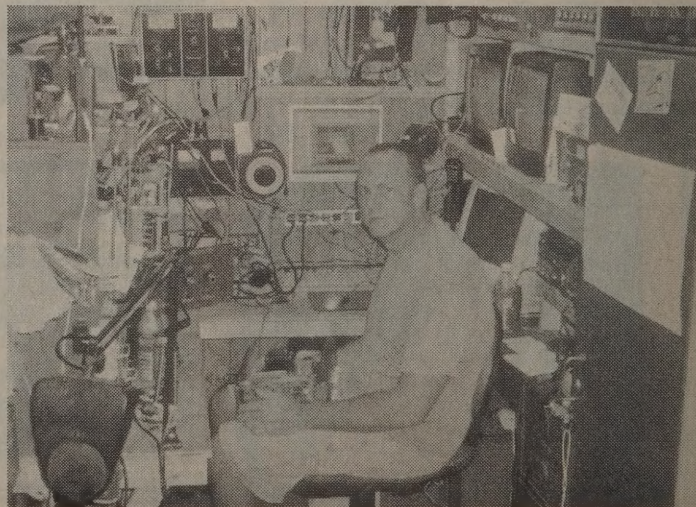
Scott, KCØOW - Guthrie, OK

DX'ers list and can't wait for the bands to open to see if he can catch K9KK to the south or KCØHFL to his north.

Meet the DXER- KCØHFL

This time we put the spotlight on one of the stations out West who is no stranger to poor conditions or lack of DX activity. Bob, KCØHFL, of Wichita, KS. Has been chasing DX on VHF and UHF ssb and ATV for several years. Bob likes to spend time between contacts building amplifiers and other gear as seen in

Bob, KCØHFL - Wichita, KS

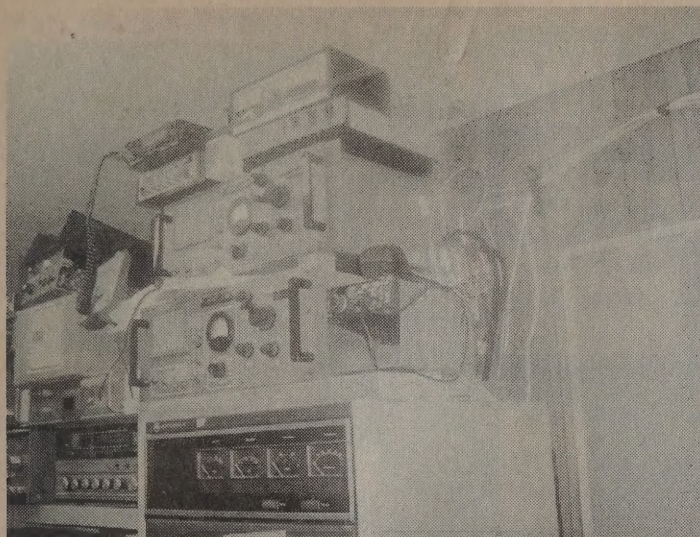
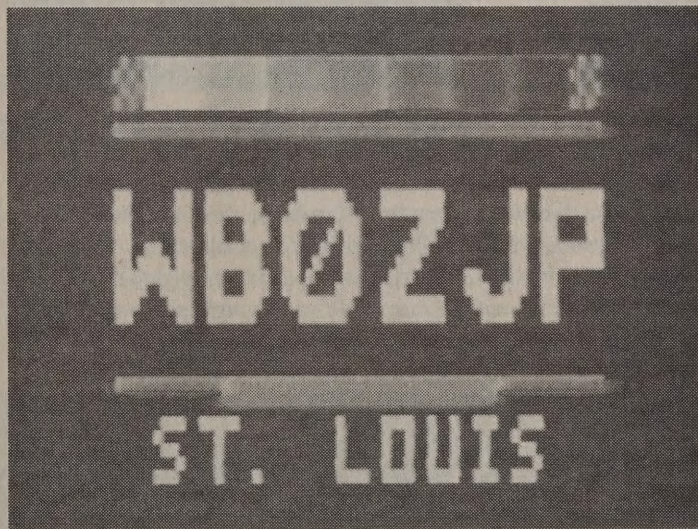


NOW A LOOK BACK

Somewhere along the line there is always someone you run into in a hobby that inspires you or peaks your interest. I have to admit there have been many in this hobby that have influenced or inspired me. Since this issue comes out around Memorial day I thought it would be nice to pay tribute to some of the DX'ers that are no longer with us and have become silent keys. I hope you were fortunate enough to have seen one of these ID slides coming in through the snow at your QTH and this column brings back some good DX'ing memories for you.

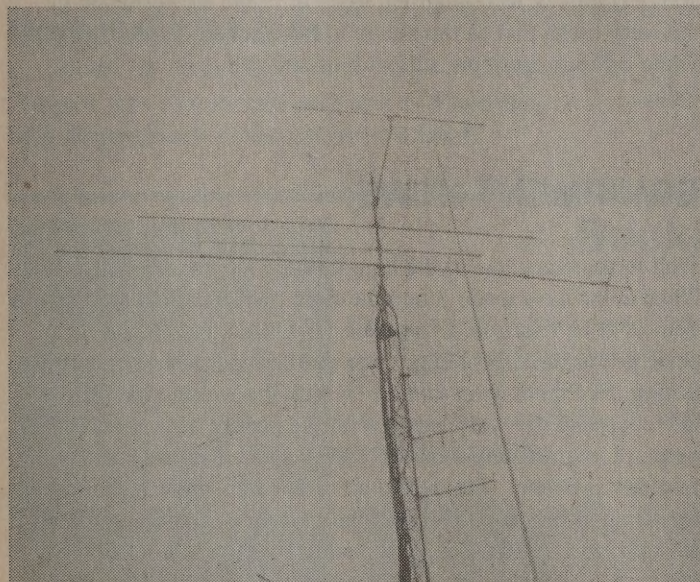
WBØZJP, Dave Williams sk 12/95

Dave was one of the first contacts I made on ATV. He was very active on the bands and built much or nearly all of his gear. He was one of the main forces on ATV from the St. Louis area and since his passing the activity level there has never recovered. I had the pleasure of knowing him for about a year before his death (my first year on ATV) and he took the time to teach me a lot about how this stuff works. Dave also was a professional photographer and did lots of work for the ATV magazines. I found out later he even did a DX'ing column in A5 magazine and contributed many technical articles as well. Here is a screen shot of Dave pounding in here from 100 miles away.



Bob, KCØHFL - shack

this photo of his busy (hands on) shack. Since he is over 450 miles from me we have only worked 2 times on ATV, but he is always willing to give it a try. Bob is an avid student of propagation and knows when the band is up by monitoring beacons



Bob, KCØHFL - loaded tower!

and radar from the surrounding states. Bob is running a P.C. Electronics TC70-20s and driving a RFC 4-110 into a Varian cavity amp. His LOADED Tower seen here riding out the winter wx has M2 antennas for ATV and 70cm ssb along with many others fed with 3 runs of Andrew 7/8" and ½ "hardline. Can you say *LOADED and ready!*

Bob would be a great DX catch at or near record distance for some of you Ohio DX'ers and is frequently available on the ATV activity logger early mornings.

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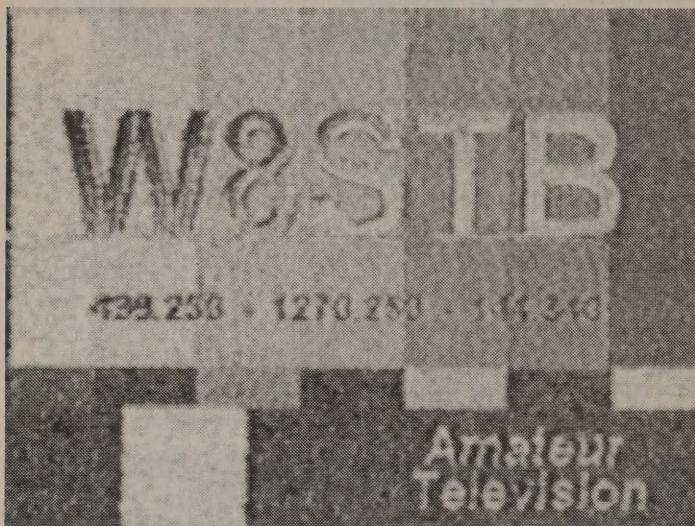
Suite 11, 213 N. Frederick Ave.

Gaithersburg, MD 20877

One of my fondest memories of Dave was during the big Christmas opening of 94 when I got to listen to Dave and Dale, NIØD, working into PA and breaking the known overland record of the time. I had to settle for OH on that opening with my 10 watt TC-1 rig but the seeds were forever sown that night.

W8STB, John Hey sk 06/01

John was the main DX target in Ohio from down here for a long time.



You could always count on John to be on if the band was up. In fact it seemed like if the band was up John was too! Some of my best memories of John were on those late night openings. We would just flash video up every 30 minutes to see if the other was still looking and he always was. You could count on John to always be there and tell that he was really enjoyed DX'ing. John loved all aspects of this mode and brought many new operators into it. He worked hard at organizing the Dayton Hamvention ATV meetings and other ATV related activities in Ohio. John is still sadly missed by all who knew him.

KA9TGX, Jeff Kerssemakers sk 11/00

Jeff was one of the *BIG GUNS* on ATV in the Midwest running the Henry amp and operating out of one of the most elaborate studios I have ever seen on ATV. In fact his studio would rival many of the broadcast studios around here. Jeff was very active on DX and you can still see many screen captures in the old ATV magazines of Jeff pounding in from West Lafayette, IN. The first time I worked Jeff he came blasting in on video while I was calling CQ pointed to St. Louis!

Jeff had an all custom rack console complete with at least 15 color monitors mounted overhead (all with different feeds), computer graphics, multiple cameras and even a view of the Corvette's in the garage. To see his shack was truly inspiring and He was also great to talk ATV with. Jeff's old running buddy Rick, N9HLL, out of Lebanon, IN occasionally still activates



that part of the state on DX and confirmed Jeff's passing. These are just three of many who have inspired me in this mode and I did not intend to leave anyone out. In fact anyone who really works at this mode gets a tip of the hat from me. If we had an ATV DX'er Hall of Fame I would think all three of the above would be well qualified to be in it. We are fortunate in this very niche part of the hobby to have several more Hall of Fame callibur operators still with us and active on the bands today.

EQUIPMENT NEWS:

Well looks like a few of the long awaited Downeast Microwave 70cm amps have made it into the field, well at least 6 of them. Tom of P. C. Electronics kept one for further testing and for a possible Hawaii DX attempt later this summer and after further testing, 5 of them went to the first 5 on the waiting list. It looks like everyone was very happy with the picture quality and RF output. Unfortunately 2 of the 5 are experiencing a shutdown or foldback problem. Tom tested all of the amps before shipment for 30 minutes and all worked fine in testing on a dummy load. It is not clear at this time if the swr or overtemp protections circuits are causing the issue but Downeast is looking into the problem as this goes to press. I will try and keep you all posted on what happens. If you have one of the amps please be sure and drop me a line to let me know what you think of it.

CONTEST 2007 !!

Well once again we are approaching the 2007 Summer ATV DX contest. I have been trying to get someone to write a program to do the logging and scoring automatically. Unfortunately I have been unable to find someone to undertake this task. Some of the programmers I have corresponded with have enough on their hands just trying to keep their current programs running with VISTA and the next OS coming our way.

If you know someone who writes code and would be willing to work on this project for a reasonable fee please have them get in

touch with me to discuss details. I hope all of you will consider sending in a log this year and as always I am willing to help you with the paperwork, scoring and submission of your log. If you just get on the air this summer and try to work as many as you can, I know the contest will be fun and exciting.

If you want to see changes in scoring or other rules be sure and let Gene know what you think. The contest was designed to promote ATV DX'ing and ATV activity in general. If you know a way to make scoring easier or even a way to make it easier to compete for someone who is in an activity starved area please share your thoughts.

WANT TO KEEP THIS COLUMN IN ATVQ ??

SEND IN YOUR DX REPORTS AND PIX!!!

Important DX Info:

The new ATV DX Record page at P. C. Electronics:
<http://www.hamtv.com/atvdxrecord.html>

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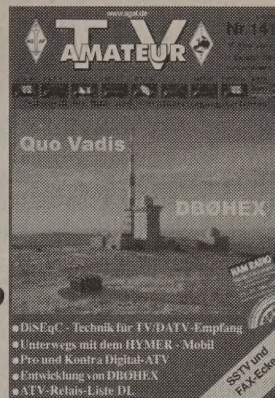
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If you have done better, be sure and send your information to Tom at P. C. Electronics. Let's hope we see those records grow this summer!

The Hepburn tropo forecast page:
<http://www.dxinfocentre.com/tropo.html>

If you are online you can post ATV CQ's and reports to the ATV Logger page:
<http://dxworld.com/atvlog.html>

ATVQ

BackPack ATV Transmitter

How many of us have one of these old cameras laying around where the tape deck does not work any more? Why not build in a transmitter and make a portable unit. Well, Gary, KB9VGD, of Burlington, WI did this and sent a few pictures so others might get the idea. I just might try that with the one that I have! If you would like to contact Gary and encourage him to write an article, his email is:

goaks@wi.rr.com

ATVQ



LINKING ATV REPEATERS

By Mike Collis, WA6SVT
Email wa6svt@aol.com
POB 1594
Crestline, CA 92325

I have been building and linking ATV repeaters since 1980. Currently I am a Microwave/Transmitter Engineer for KCBS/KCAL TV in Los Angeles. I have designed and built both analog and digital broadcast television links. Enough about me, we will continue on with "Linking ATV Repeaters".

Link Types: There are two basic methods to linking ATV repeaters, the star AKA hub approach and duplex point to point. A third way is duplex loop, but this gets expensive.

Star linking involves a centrally located ATV repeater with satellite repeaters going different directions from the star. Each satellite repeater receives the main output of the star repeater and transmits back a dedicated simplex path that is usually point-to-point back to the star repeater. Star linking is by far the cheapest and simplest way to link.

Duplex point-to-point linking involves a duplex frequency pair and equipment consisting of two transmitters and receivers for each set of repeaters linked. It is about 30% more expensive than star linking.

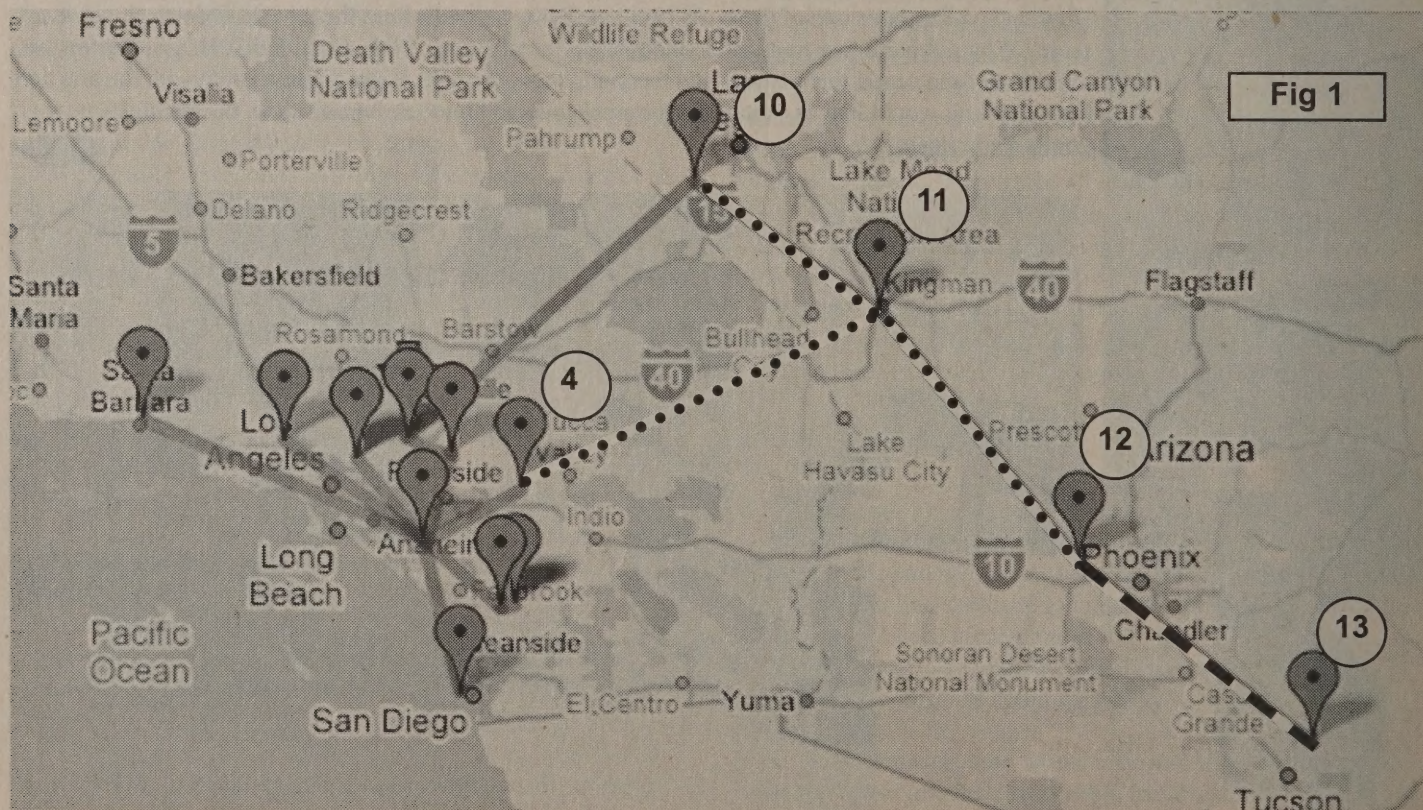
Loop linking is done with three or more repeaters by using

duplex links between repeater one and two, two and three, and three back to one. Each repeater would have two link transmitters and two link receivers per repeater site. Duplex linking requires only one transmitter and receiver per link site.

Link Modulation:

AM/VSB has some limitations. Picture quality degrades because the TV IF cuts out part of one sideband so color level will decrease by almost half each time you link. Generally this has already been done with AM or VSB in and VSB out of a repeater. The video bandwidth is limited to about 4 MHz due to the 4.5 MHz sound trap in the receiver IF. Sync compression can be a factor too. A properly built and adjusted VSB transmitter will take care of compression and address some of the differential phase and gain concerns. Using a quality grade demodulator with a Nyquist filter and synchronous detector will give full flat video response to 4.2 MHz, and the detector will reduce differential phase and gain.

The Nyquist filter has more loss (about 3 dB) in the area (.75 MHz) around the visual carrier and then tapers down to 0 db (not counting regular filter losses) up to 4.2 MHz below the visual carrier in the 45.75 MHz IF (inverted sidebands in TV



If's). This is the best you can do for AM/VSB systems. Most TV/VCR IF's do not use Nyquist filters but have a peaking coil near the chroma frequency. Put a waveform monitor or scope on the receiver's video out and transmit a multiburst pattern into it and see how non-flat the video response is, and then do the same on a receiver with Nyquist filtering, you will be amazed. The drawback of Nyquist filtering is a reduction of 3 db signal to noise for the same signal input. Adequate signal input will take care of that concern.

FM modulation is a far better way to preserve video quality on links with multiple hops having nearly the same video quality at the end point. 4 to 5 link hops can be done with great quality. Signal to noise is 20 dB better than AM/VSB at the point of P5. This allows you to build in higher fade margins, more on that later in path design. FM can be amplified with class "C" amplifiers maximizing power output and final amp efficiency, no sync compression issues here. For most ATV links 4 MHz deviation and 14 to 17 MHz wide IF filtering will allow two or more sub-carriers to be used. This is by far the simplest. Best performing analog linking you can do.

Digital has the best signal to noise and least distortion but has two other issues not seen in analog, latency (audio and video delay) and the ability of the modem to compress analog video and audio that is noisy or has QRM in the picture. Typically pictures at P3 and below break up, the modem tiles the video, the video freeze frames and in worse cases just goes away. Digital does allow two different video streams to be sent at the same time. Another issue of digital is when used with typical analog

Figure 1

Mt. Potosi - 10 - N7ZEV
Heyden Pk - 11
White Tank - 12 - K7PO
Mt. Lemmon - 13 - W7ATN
Snow Peak - 4 - W6ATN

Proposed ATN Links

From 10 to 11 - 916 MHz Link

From 11 to 10 - 5.8 GHz Link

From 11 to 12 - 1.2 GHz Link

From 12 to 11 - 2.417 GHz Link

From 4 to 11 - 2.477 GHz Link

From 11 to 4 - 5.8 GHz Link

Links Under Contruction

From 12 to 13 - 2.417 GHz Link

From 13 to 12 - 1.2 GHz Link

<http://www.hampubs.com>



Figure 2

Santiago Peak - 1 - W6ATN

Valley Center - 6b - N6NWG

Mt Palomar - 6a - W6NWG

ATN Links

From 6b to 6a - 2.417 GHz Link FM

From 6b to 1 - 2.417 GHz Link FM

repeaters where the video is demodulated back to analog then re-encoded to transmit to the next repeater in the system. Digital artifacts will show up because about 60% or more of the analog video is tossed out and more latency is added in the encoding and MPEG compression. The key with digital is once your video is encoded into MPEG is to keep it that way between sites.

Path Design:

It is best to design in 30 dB fade margin beyond that needed for P5. Generally 20 dB is all that is done on ATV with FM modulation. AM/VSB it may be difficult to get 20 dB fade margin and 10 to 15 dB is all that can be done. Never try and design a link with just at P5 level as fades will degrade the picture or in some long path cases fade out all together.

The higher microwave bands work great for links because less issues with radar and other ham QRM, and there is more bandwidth available. By using dish antennas at both ends of the link, for a given dish size, same power into the dish when the frequency is doubled the received signal strength goes up 6 dB. 2.4 GHz and 5.7 GHz are good link bands. In some areas where little other activity is present. 1.2 GHz can be used on FM. The 915 MHz band is a mixed bag as some areas have heavy part 15 use with cordless phones, WiFi, and where part 90 commercial operations are present. Most radio sites also have half KW or better paging transmitters adjacent to the ham band usually with-

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For example a major new feature is four individual sync detection circuits allowing for true priority based ATV receiver switching. \$349.00



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out any output filters. I do not recommend yagi antennas for links because you need more gain to produce a robust link. Dish antennas have much better gain and radiation pattern that will allow frequency reuse when used with FM modulation. I have five 2417.5 MHz FM links coming back to ATN's Santiago Peak repeater from locations with as little as 20 degrees heading separation. The key here is to design the links to stay hot 24/7 to quiet each of the receivers. For frequency reuse, it helps to design under normal path conditions the ERP of each link station to produce similar received signal levels at each receiver at a receive site, this gives

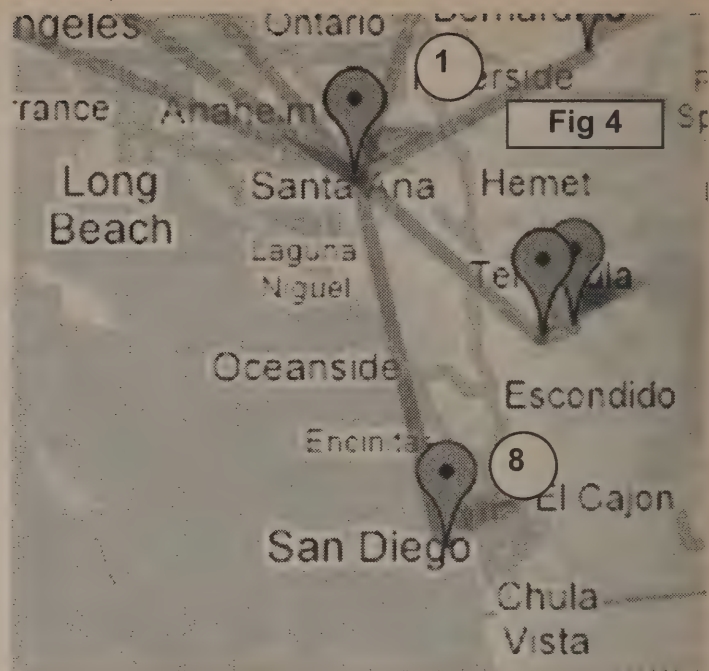
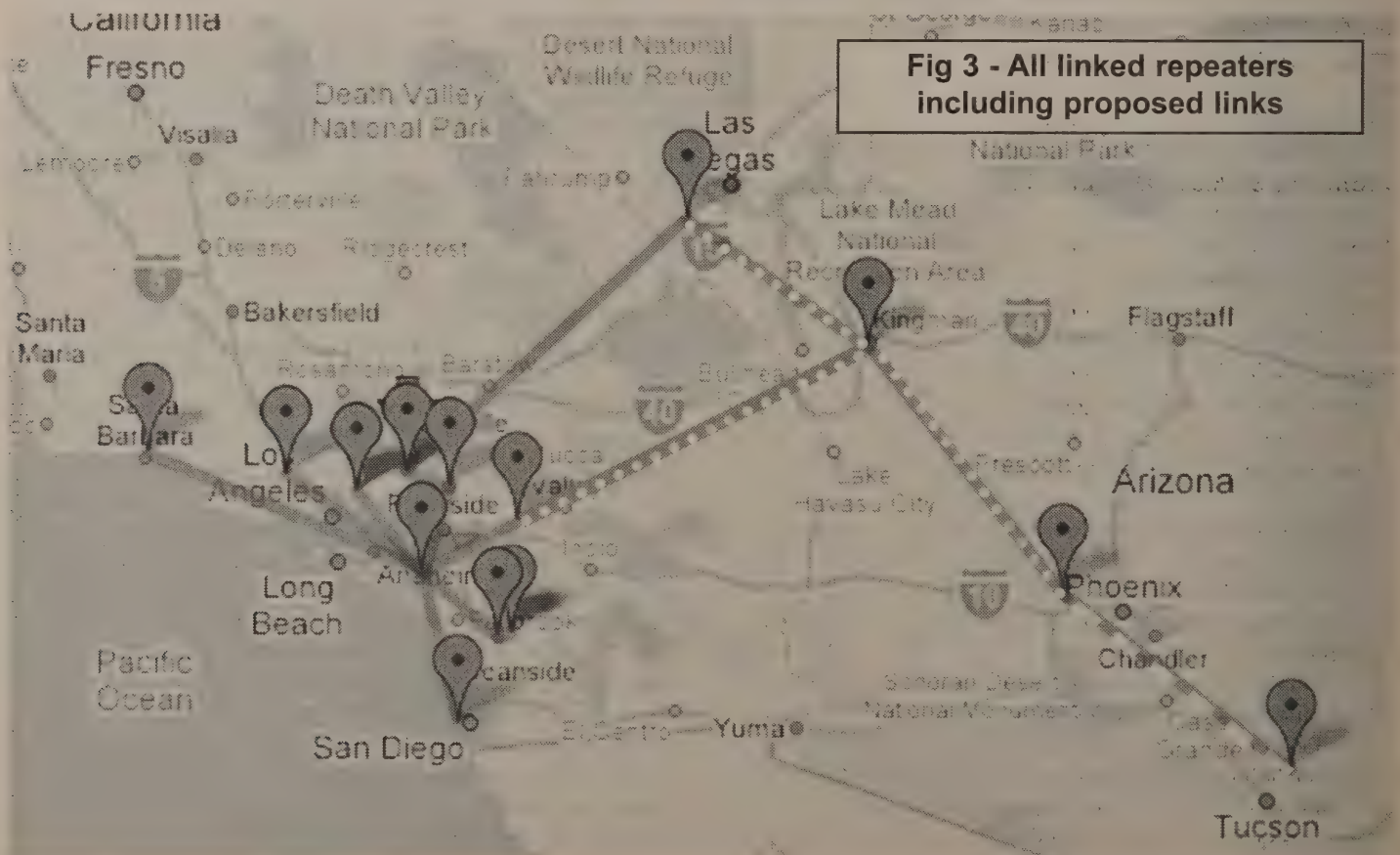


Figure 4

Santiago Peak - 1 - W6ATN
Point Loma - 8 - W6ATN

ATN Links

From 8 to 1 - 2.417 GHz Link FM
From 1 to 8 - 1.253 GHz Link VSB



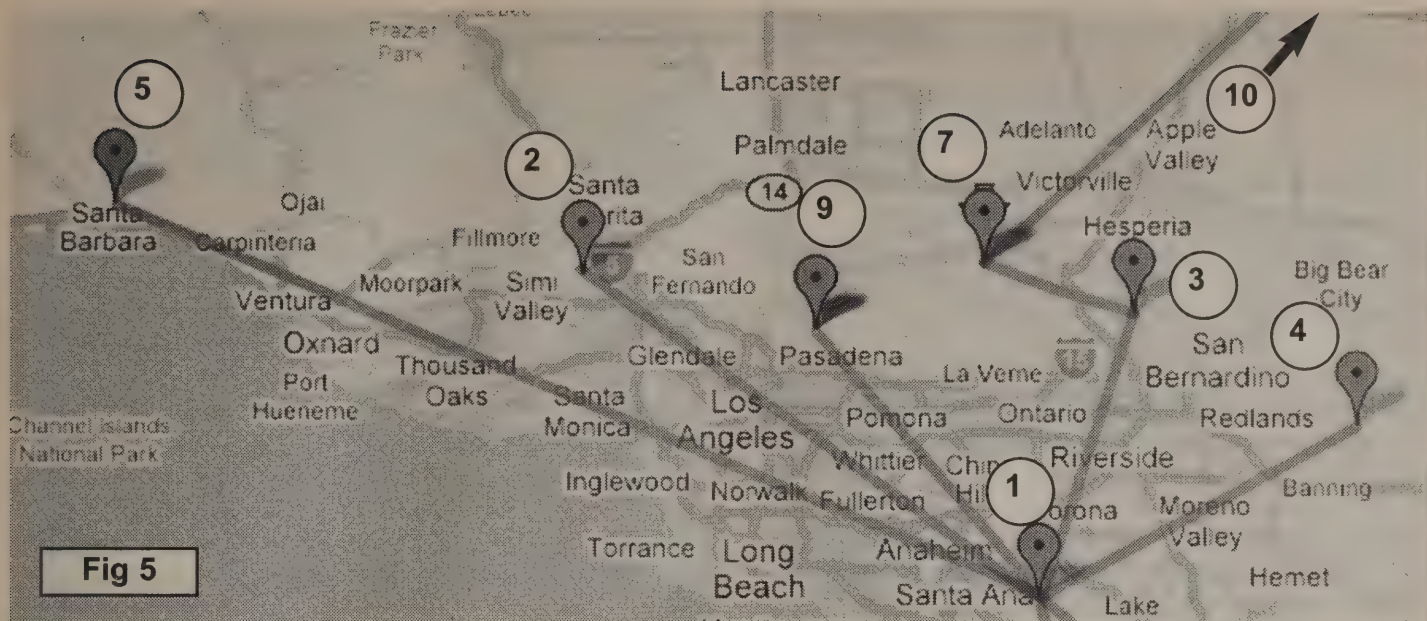


Fig 5

Figure 5

Santiago Peak - 1 - W6ATN
 Oat Mountain - 2 - W6ATN
 Crestline (Job's Peak) - 3 - W6ATN
 Snow Peak - 4 - W6ATN
 Santa Barbara - 5 - WB9KMO
 Blue Ridge Mt. - 7 - W6ATN
 Mt. Wilson - 9 - W6ATN

ATN Links

From 1 to 2 - 1.253 GHz Link FM

From 2 to 1 - 2.417 GHz Link FM

From 1 to 3 - 5.910 GHz Link FM

From 3 to 1 - 2.417 GHz Link FM

From 3 to 7 - 5.810 GHz Link FM

From 7 to 3 - 2.417 GHz Link FM

better desired to undesired signal ratios under fading conditions. It is recommended that receive signal levels be designed for -55 or better dBm for optimum performance with minimum fading.

I have used several ham bands for linking and have found no major difference with fading other than the timing differs somewhat between bands during inversion layer fading. I have a path between Mt. Wilson and Santiago Peak about 50 miles with 1 watt on 5.8 and 5.9 GHz with better path reliability compared with 2.4 GHz. This is due to the increased dish gain of about 9 dB at each end with only a 9 dB greater path loss. I have a 9 dB better fade margin. Rain attenuation is not a factor of concern up to and including the 10 GHz band. 24 GHz band (our next band up) does have major problems with rain fade is not recommended for links of more than a few miles.

From 7 to 10 - 2.417 GHz Link FM

From 10 to 7 - 1.265 GHz Link FM

From 1 to 4 - 1.253 GHz Link VSB

From 4 to 1 - 2.417 GHz Link FM

From 1 to 5 - 1.253 GHz Link VSB

From 5 to 1 - 2.417 GHz Link FM

From 1 to 9 - 5.810 GHz Link FM

From 9 to 1 - 5.810 GHz Link FM

Links Under Contruction

From 9 to 2 - 5.810 GHz Link FM

From 2 to 9 - 2.417 GHz Link FM

Microwave equipment for your links and budget:

Some hams use satellite receivers but be aware, the IF's in these receivers were designed for 11 MHz deviation, 30 to 36MHz bandwidth, Do not use them unless that receiver was a high end unit with separate wide and narrow IF filters used in the narrow position or QRM and signal to noise issues will degrade performance. Commercial surplus microwave equipment is easier to pick up as TV stations are converting to digital operation for DTV and tossing out their 7 and 11 GHz microwave gear. This gear can be converted to 5 and 10 GHz. The cheapest and easy to get equipment is the Part 15 FM video senders like Wavecom Jr and others. The 5.8 GHz units are less than \$100 per set and are 50 mw out of the box. The 2.4 GHz units are about 1 mw out of the box and about 6 mw with the attenuator pad pulled. They usually have 6 and 6.5 MHz subcarrier so TV audio plus a

spare audio path for other uses is available. I ran a 24 mile path on 5.8 GHz with a stock set of 5.8 GHz Wavecom units with one site using a six ft dish and the other a 2 ft dish with P5 pictures.

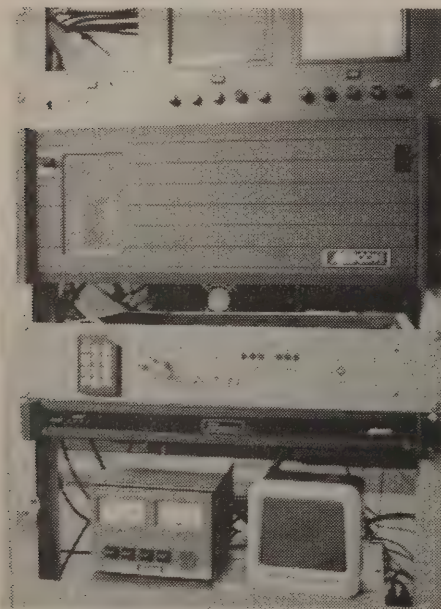
I take the units out of the box and use a Hammond or Bud 1590D size die-cast box for each unit. I have another path, 174 miles long, at 2417.5 MHz using a 10 ft dish on the Blueridge side and an 8 ft dish on the Potosi side with P5 pictures (tall mountains on both sides).

Surplus dish antennas work good for ATV links. The feedhorn may need to be changed out and either a home brew horn or 2.4 or 5.8 GHz feed can be taken from one of the cheap part 15 small grid dishes and used in the focal point of a used commercial dish. You can even make up a dual band horn to allow crossband linking with one dish. This is popular when star linking using the repeater output as a link one direction and a higher microwave band for the return link at the satellite repeater site.

Controllers:

When linking multiple repeaters, several VOR 3 controller boards (video operated relay – P.C. Electronics – <http://www.hamtv.com/>) can be connected together to form a priority input selection on the repeater, after 3 boards, it is better to use the Intuitive Circuits (www.icircuits.com), ATVC-4 Plus controller board, this gives four inputs with sync detection of each input in a priority basis. At most of our ATN sites the number of inputs needed were more than two or three VOR 2 boards (the model that was available at the time) could provide. We developed the 1st priority controller with ten inputs, 8 priority inputs plus tower camera input and ID input. The controller has built in DTMF decoder, voice/command repeater with remote base (146.43 MHz ATV intercom control). The controller has

camera remote functions, and data to communicate to a graphics overlay to let the repeater user know what input keyed up the repeater for 2 seconds then fades out of the picture. The overlay has telemetry inputs from the controller displayed just above the top of the vertical sync allowing a professional video monitor with underscan to display the data yet it's not visible with a standard monitor or TV.



Santiago Peak, 5910 transmitter and ATN 9 input priority controller is below.

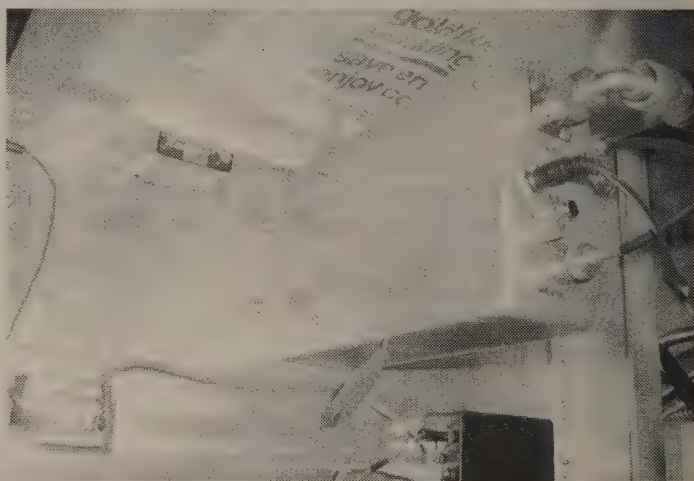
ATN's members
Robert, KA4JSR, and

Mike, WA6SVT, are developing a new 21st century controller with all above plus multiple outputs for dedicated link transmitters and to eliminate the current link mute patch board we had to put into older generation controllers. The new controller is micro controlled and programmed custom to each site via a laptop computer and Robert's software.

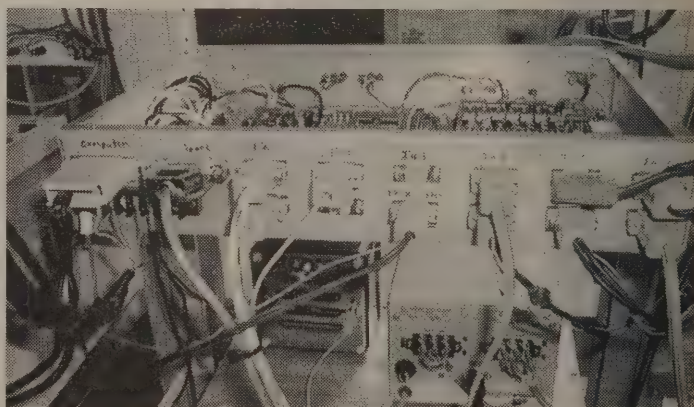
The reason for priority in a controller is traffic control to allow local repeater operation when activity is active elsewhere in the network and not involving users on that local repeater. Usually the priority is as follows: 1. FM input to repeater, 2. AM/VSF input, 3. closest repeater, and so on till the most distant repeater, tower camera, and then ID with the ID interrupting or with graphics overlay every 10 minutes as required by Part 97 rules.

I would like to thank Gene, WB9MMM, for the work on the link maps.

ATVQ



Back of ATN controller



Packaging of 2417.5 MHz link receiver at Santiago. The rack panel is now full with 7 receivers on a 5 1/4" rack plate. the receivers are:

1. 434 MHz AM/VSF input
2. 2441.5 MHz FM input
3. 5810 MHz Mt. Wilson
4. 2417.5 MHz Oat Mt.
5. 2417.5 MHz Blueridge via Jobs Peak
6. 2417.5 MHz Snow Peak
7. 2417.5 MHz Santa Barbara
8. (separate panel) 2417.5 MHz Point Loma
9. 2417.5 MHz Mt. Palomar via Valley Center

Unconditional Elmer Support Brings ATV To Tucson, Arizona High School

By Miguel A. Enriquez, KD7RPP, Ph.D., M.B.A.

Email: enriquezma@cox.net

Mathematics and Psychology Teacher

Pueblo Magnet High School

3500 S. 12th Avenue

Tucson, Arizona 85713

When asked if it were true that he had died, Mark Twain responded "the premature report of my demise has been greatly exaggerated." A similar response seems appropriate when present day doomsday advocates question the imminent demise of ham radio.

For those of us actively involved, ham radio is very much alive all around the world and in outer space as well. And after planning and developing an amateur radio club at the high school where I teach, ham radio has now found its way into my algebra classroom. In fact, amateur radio is the catalyst that is taking my students to higher levels of motivation and achievement. Math is no longer an abstraction for my students, boring and mysteriously elusive. Mathematics is now a necessary step to the fun and exciting experience of ham radio, with a specific interest in amateur television.

In searching for a way to make math more relevant, practical, feasible and dramatic for my students, I began to explore their understanding and interest of outer space exploration, geography, science, art and communication. I discovered that my students were not familiar with many of these subject areas but when I began to tell them how ham radio is a ticket to far away travel and exploration, their interests peaked. My students come mostly from low socio-economic and under-educated popula-

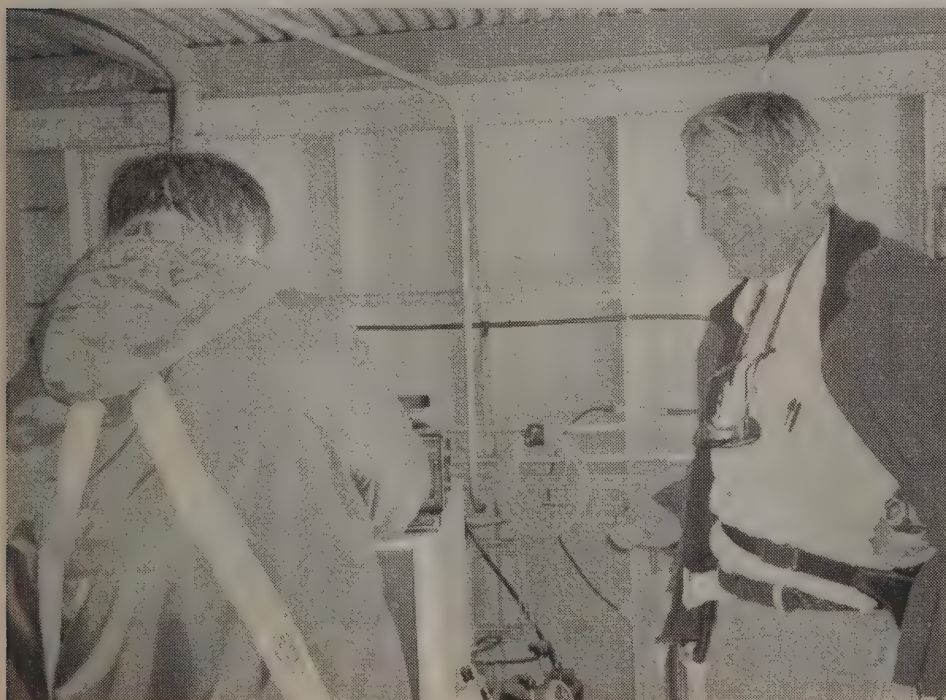
tions. Their expectation is that their future is destined and they need only act out their assigned role.

Ham radio, however, is changing their perception of themselves and their future. When I first began teaching them the Morse code, they began to pay more attention in class. When I made completing the daily math assignments a precondition to their learning ham radio, misbehaviors and class disruptions disappeared entirely. And when I offered them instruction in ham radio theory, operating procedures and rules and regulations, their math scores and comprehension skyrocketed. This accomplishment can almost be considered the Holy Grail for teachers. The magic of ham radio for present day students is as alive and viable today as it was for our ham radio forefathers almost a hundred years ago. The magic is very much still there.

The next challenge for our club's development was finding the necessary resources of space and equipment. I began to approach our school administrators, who in spite of their over-demanding workloads, quickly pledged their support for the club. I next called several of the ham radio clubs in Tucson, asking for their assistance. All voiced support but only one club actually extended an invitation to sponsor our club. The Catalina Radio Club, sponsored by Raytheon Corporation, became our benefactors.

The Pueblo Magnet High School Amateur Radio Club was formed in August 2006. One month later, the Pueblo ARC was selected by Anoushe Ansari, the civilian astronaut aboard the International Space Station (ISS) as one of only four clubs to communicate with her onboard the ISS. And with the news media watching and recording the event on September 27, 2006, Ms. Ansari's calls to our club were received but our attempts to complete the communication went unanswered. The equipment we were using was grossly inadequate.

The Pueblo ARC resolved to not accept defeat and to work diligently to succeed in



Ron and Mike busy at work making final connections to the ATV repeater.

effectively communicating with astronauts aboard the ISS. The students immediately began to study for their Technician License. Two months later, three students took the tests and flunked the first time. They returned four weeks later and the first three licensees were Daniel Carrillo, KE7KSC, John Valencia, KE7KSD and John-Mark Linnaus, KE7KSE. Hector Mendoza earned his Technician License, KE7LHZ, two weeks later. Twenty two other students are presently continuing their license examination studies.

In early December 2006, Ron Phillips, AE6QU, became our ATV Elmer. Ron wrote an email offering his support to our club. In discussing the club's goals and objectives, it was quickly established that ATV was of prime interest to our club. Ron very quickly demonstrated that his support was real. In early January, with three feet of snow on the ground, Ron and Mike Collis, WA6SVT, set about installing an ATV repeater and transmit / receive antennas atop a 160 foot tower on Mt. Lemmon, to replace equipment destroyed by forest fires three years before. I aided the project by shoveling snow to get the truck out of a snow bank where it had become stuck.

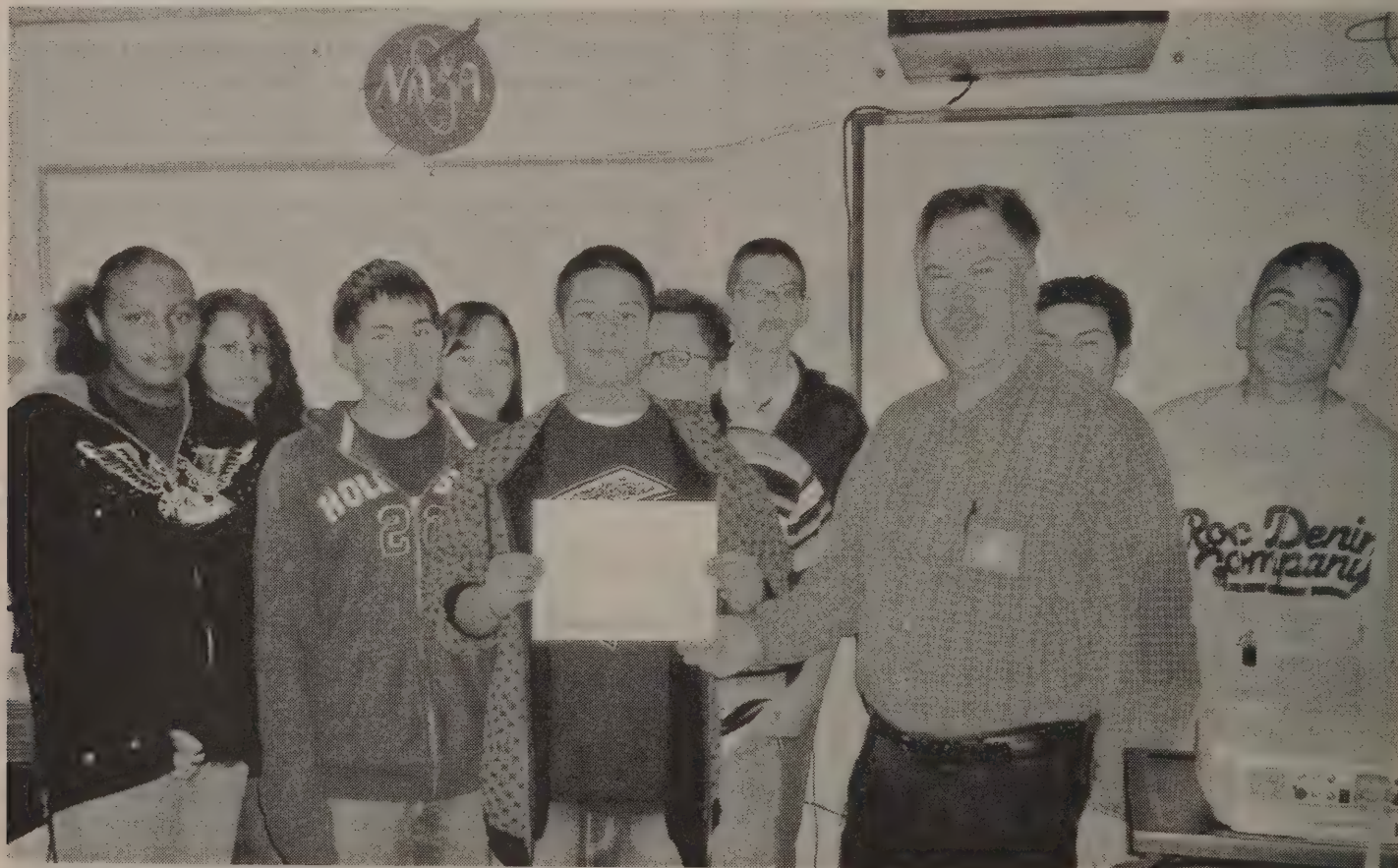
To get our club on the ATV airwaves, Ron made the 260 mile roundtrip from Sun City, Arizona several times to gauge signal quality and locations. He attended several ham radio functions

in Tucson with the explicit objective of promoting ATV in Tucson. Ron again returned and provided a transmitter and receiver for our club. He next showed up with low loss cable and connectors. He followed a week later to inspect the antenna tower the students had erected and to attend even more ham radio club meetings.

Ron's contributions have given impetus to some ambitious objectives for our radio club. The Pueblo ARC has as an interim objective to conduct a slow-scan television teleconference with astronauts aboard the ISS in the next two years. Another objective is for Pueblo ARC members to become proficient using ATV technologies and to serve as ambassadors to other schools in Southern Arizona to create interest in and to assist in the development of other high school and middle school ham radio clubs.

This article might appear to have been written for the purpose of extolling Ron Phillips' virtues. Or perhaps, this article was written to inadvertently embarrass Ron Phillips, an otherwise quiet and unassuming individual. But it was not. It was written as due recognition for a ham operator whose demonstrated commitment and dedication to ham radio symbolizes the very best spirit and contribution of ham radio Elmers.

ATVQ



Tom Fagen, ARRL Section Manager presenting ARRL Club Affiliation Certificate to Pueblo ARC. The names are: (left to right): Shayjaun Bowman, Andrea Cruz-Perkins, John-Mark Linnaus, Araceli Munoz, Mario Bustamante (President), Antonio Martinez, Gilberto Valenzuela, Tom Fagen ARRL Section Manager, Mauricio Chavez and Gabriel Baca

Frequency Extension For Spectrum Analyzers

By Roberto Zech

Translations: Klaus Kramer, DL4KCK Email: DL4KCK@t-online.de

www.agaf.de

Sometimes we need suitable measuring instruments to record the higher bands. If you have a spectrum analyzer for a range of up to 1 GHz (or 500 MHz), these modules help to exploit the range between 5 and 12 GHz.

Circuit Design

The frequency extension consists of two parts: the oscillator and a passive mixer. For the oscillator two MMIC (ERA-1) and a resonator are being used. One MMIC performs the oscillation and the other works as the output buffer.

What is the function-principle? The first MMIC's output is fed back to the input via an on-board resonator, and it will oscillate at the resonant frequency of this band filter. But it needs a suitable length of the phasing line to do this. The resonator consists of a cavity with 16 mm diameter and up to 10 mm height.

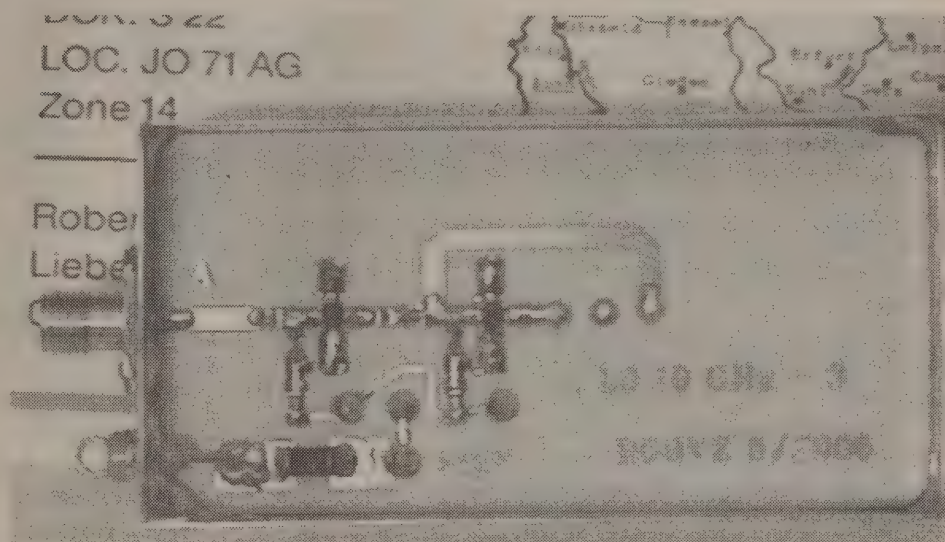
Coupling is performed by soldering pins looking about 1.5 mm into the cavity. Across a tuning screw sets the oscillator frequency. Tuning is separated into three bands of several 100 MHz width. With the screw fully

penetrated we are getting around 5 to 6 GHz (band 1). Tuning out the oscillation will stop and start again in a second band at 7 or 8 GHz (up to 400 MHz range). The next band is at around 9 or 10 GHz.

Depending on components we are able to generate up to 13 GHz waves, the "power" is around 1 mW. The second MMIC produces up to 10 mW output. Now via coaxial cable this is fed to the mixer at it's LO connection. A signal of interest is fed to the RF input, and the mixer output (ZF) gives the intermediate frequency via coaxial cable to the spectrum analyzer input.

Construction

The oscillator fits into a tinplate housing of 37x73x30 mm, the mixer housing has 37x55x30 mm. Both printed boards are from



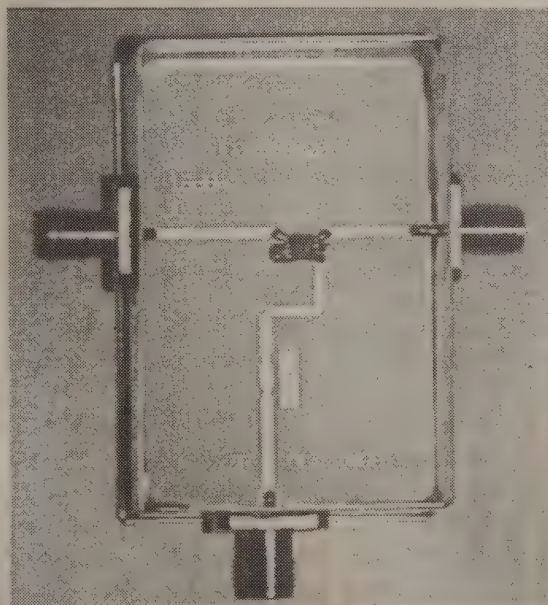
RO4003 material with 0.81 mm, components are of SMD type. Wired components will not work successfully above 1 GHz!

Usage Examples

At first we have a simple frequency conversion with two bands: "input 10.3 GHz minus 10 GHz LO = 300 MHz IF" as well as

"LO 10 GHz minus input 9.7 GHz = 300 MHz IF". Both ways we are getting 300 MHz IF, so a watchful observation is needed.

With our second example a tracking generator (from a network analyzer) is used to visualize a filter response curve. Tuning is simplified a lot by this. Two mixers are needed, fed from the same oscillator. The tracking generator output is fed to the "ZF" output of the second mixer. There it is mixed up to the microwave frequency with the LO. What was the first mixer's input is now the second mixer's output! This signal is fed to the object of interest (filter etc.), its output is fed to the first mixer's input. Now on the spectrum analyzer screen a filter response curve should be visible showing the filter's frequency coverage.

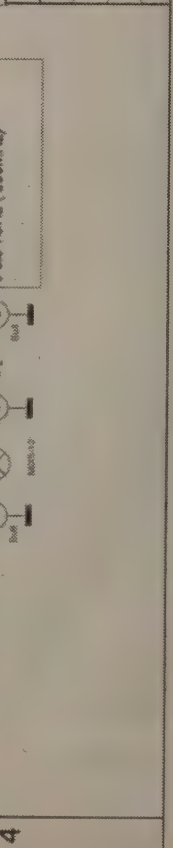


For data of the prototype modules see the circuit diagram on the next page. Ready-made units are available from the author:

Roberto Zech, Liebenauer Str. 28, D-01920 Brauna.

Internet: www.dg0ve.de

ATVQ



Obsolete

By Henry Ruhwiedel - AA9XW Email: a9xw@cs.com
5317 W. 133rd Street
Crown Point, IN 46307

4000 carriers in a 6 MHz channel may seem easy, that's 1.5 KHz each but consider this is from one transmitter and all are on simultaneously, so the power is divided by 4000, so a 100 watt signal is 25 milliwatts per carrier vs. 100 watts per carrier for CW. We never get something for nothing. But even rudimentary filters can provide IF bandwidths of 400, 250 or 100 Hz. Remember the SAW filters in Collins and other fine receivers? I recall my old SX101A had a 50 Hz bandwidth. Yes it howled as most narrow filters "ring" but digital filters can achieve a bandwidth of 1 Hz or less.

Now here is where hams can come in. With the massive gate array chips (think millions of TTL logic gates, AND, OR, NOR, Invert, etc) on a single chip, we can custom make our own modulation scheme. We can create signals to fill in blanks in spectrum and time. Think about the video signal spectrum. Video sidebands are not continuous; they are placed at multiples of the horizontal frequency rate (15,734 Hz). Their amplitude and existence changes with the video content. Now you see it, now you don't. So there are "holes" between frequencies and "holes" in time when a particular sideband is not being used. These holes are very consistent since they all have a base numerical relationship. Because of that, we can create new signals that fill those holes.

Disney uses a system to transmit a second picture on the analog carrier of a TV station with orthogonal modulation and frequency response shaping. The 2nd signal simply exists when the first does not. To make it simpler, the system simply adds the second signal in an IF mixer to modulate the already video 1 modulated signal. A timing loop locks the two signals together to keep the orthogonal relationship. This is similar to the I/Q carriers for color.

The same phase/amplitude relationships are advantaged for OFDM and COFDM modulation, QAM is another form. But even these still have unused portions of time and spectrum that can hold additional information. If you divide the QAM code bits into high level and low level, you can create a QAM signal inside a QAM quadrant. When a signal is strong, the receiver gets all the bits, if there is high level noise or weak signal, the quadrant bits can be combined at the receiver into a single bit and still be used to regenerate the original QAM information. Think of it as over sample, under sample. Take 1 byte; divide it into 4 low and 4 high bits. Each of the quadrants of the QAM signal represents each of the 4 high bits. Each subset of 4 bits exists in each of the 4 quadrants. But we can substitute half of those subsets to provide another set of 8 bits, 4 in each of two quadrants.

Since the QAM signal represents 0's and 1's, we can use a smart multiplexer to combine several bit streams into one QAM signal. This is time division multiplex, and with a little cleverness, we can share the code (half the QAM bits for one, half for the other) to create two simultaneous data streams per carrier. So we can have frequency division, time division and code division all working to mash more data into less space.

Thus I challenge those among us with high levels of digital smarts, to create a new digital modulation system. We could trunk relay the combination signal among many sites, and make a ham network that would be very efficient, many times more than packet, or other simple data systems. We are no longer limited by technology, only our ability to use it. Using the massive gate array chips, we can create any type of signal we care to, and modify it with nothing more than software. Think about it! Design it yourself modulation systems. Boggles the mind!

ATVQ

Sidebar

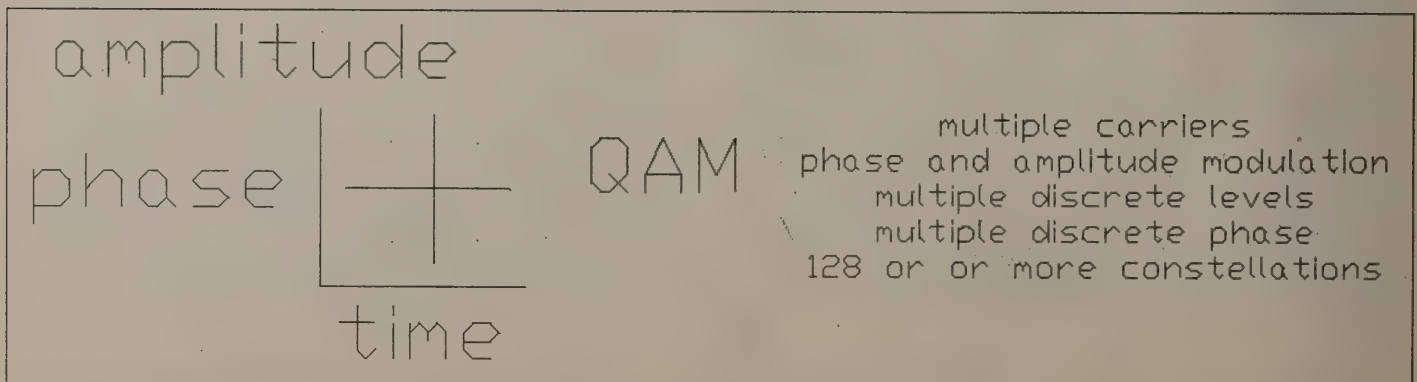
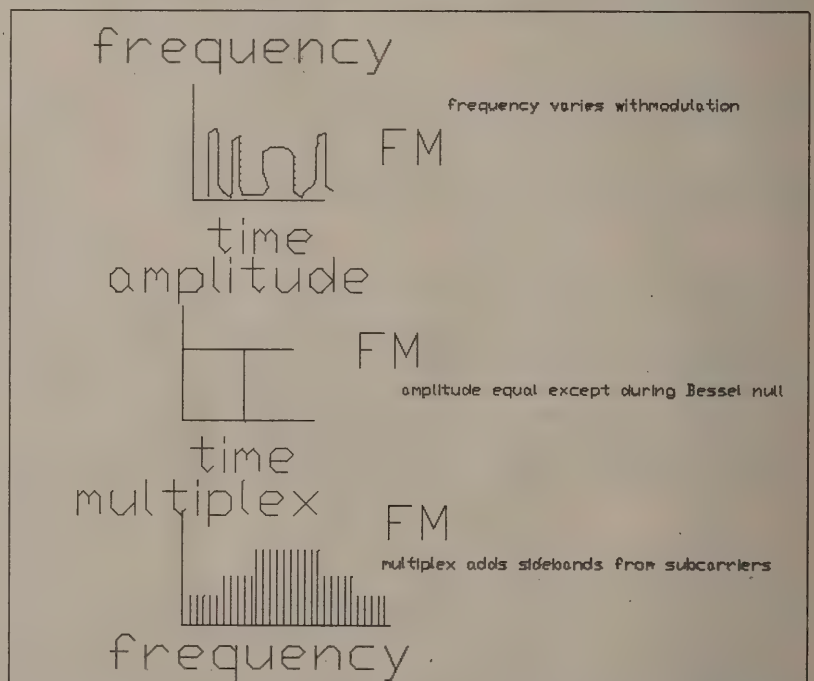
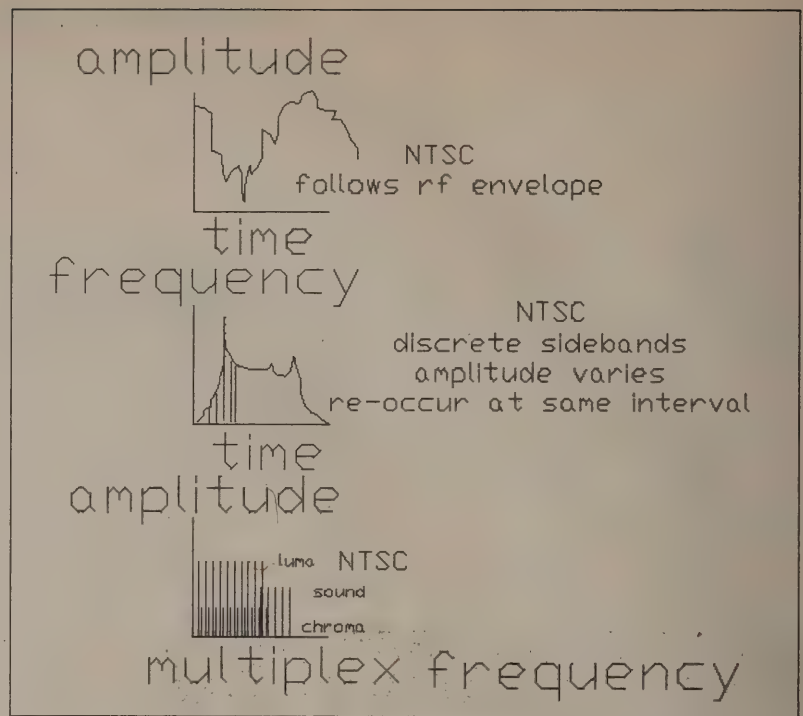
First, all RF signals are ANALOG, the envelope represents the information and that may be analog or digital. When we modulate/demodulate the signal, we recover amplitude and frequency components over time. Because the modulation is now CW, there are gaps in time when there is no signal sidebands, no carrier and spaces between the discrete sidebands caused by the repetition rate of the modulation. For example, video has a repetition rate equal to its horizontal and vertical scan rates, digital has repetition rates equal to the symbol rate baud rate or data rate (which ever number you want to use). There are sidebands that are harmonically related or interleaved to fit in the discrete spaces to multiples more information. We can also phase modulate the signal into I, Q format providing constellations of data that represent discrete amplitude, phase and time intervals. 4 QAM would be four discrete logic points in time, 128 QAM represents 128 logic points in time. These points only exist for the amount of time of each "byte" so each quadrant is "blinking" with 0 or 1 states.

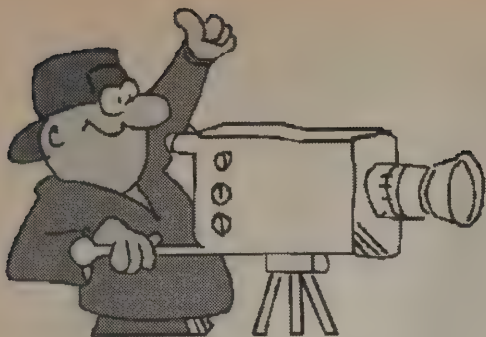
Now let's divide the data rate into blocks. This could be MPEG, JPEG or any coding scheme we want to use. AAAABBBBBCCCCDDDD. For error purposes, we scramble the blocks or may add FEC forward error correction. We can add subcarriers to our main carrier, let's say 6000 of them. Each represents a QAM constellation.

We can do some bit reduction in the data stream to reduce the data load, so let's get to ABCD. We now have time to insert other data stream (data division multiplex) AEBFCGDH. We now have eight channels of information vs. four. We can expand this to any number we wish, and if there are empty time periods, repeat data blocks or insert other opportunistic data.

Now let's tell our receiver to synchronize to GPS time. Accurate to 1 nanosecond. We command the receiver to turn on for the first 100 microseconds. In that time period, we tell the receiver which data channels to decode [a, d, f, h] and when those blocks of data are being sent. The receiver now turns off, processes the data, and turns on for some period of time during the remaining portion of the 1 second to get its data blocks then turns off and spends its "spare" time decoding the data. [time division multiplexing]. Now you can have any number of receivers, each receiving its own individual set of data blocks, on each of 6000 subcarriers, and as many time slots as you want limited by the digital processing power (processor speed in GHz). Bingo, 80 full TV channels, and anything else you want individually addressed to every ham license holder in the world, all in one 6 MHz data channel! Yeah it is really happening right now; go look at a Verizon Vcast phone.

ATVQ





Harlan Technologies

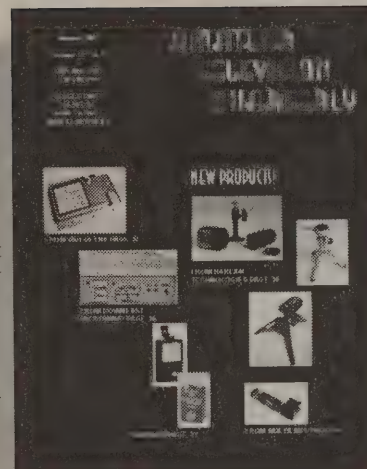
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ATV Secrets is a great place to start your ATV adventure! Volume I has 64 pages, tightly packed with information covering all aspects of getting started, where to find activity, equipment, how to DX, and answers frequently asked questions about power, antennas, vestigial sideband operation and more. Everything the beginner in ATV needs!

Volume II is a mammoth book with 292 pages of technical material. More than 40 authors present over 90 technical projects and theory topics to fully acquaint anyone from novice to expert in the how and what of TV, video, and ham TV. Divided into 11 chapters, the book presents tested projects for all areas of interest in ham TV including antennas, amplifiers, repeaters, receivers, transmitters, video accessories, and more!

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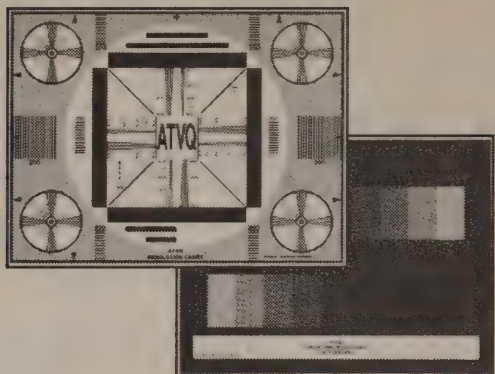
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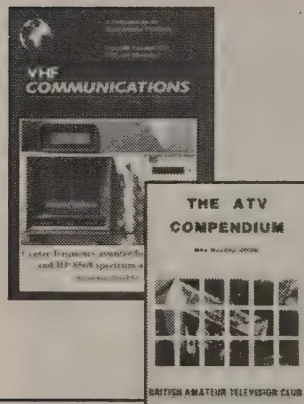
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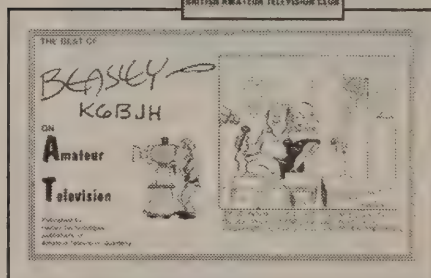
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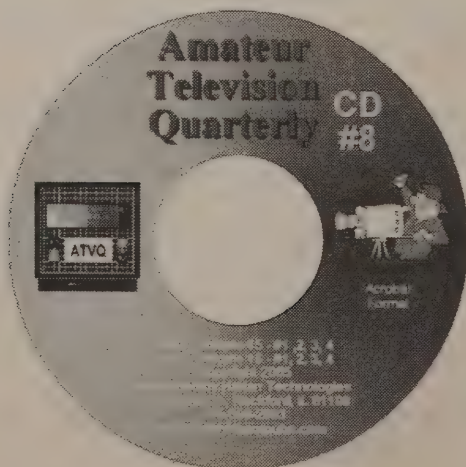
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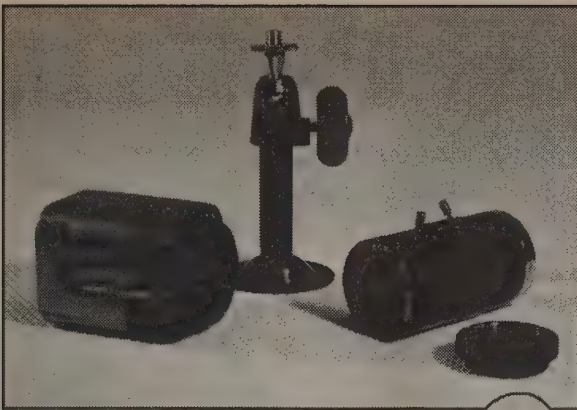
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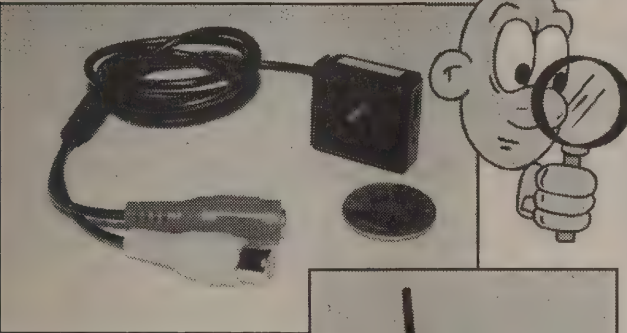
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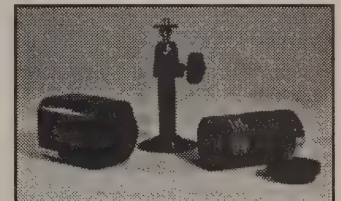
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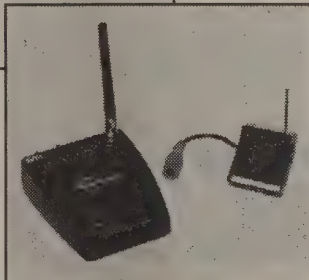
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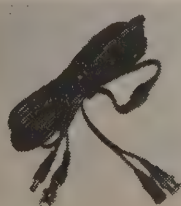
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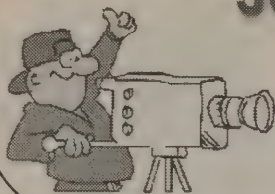
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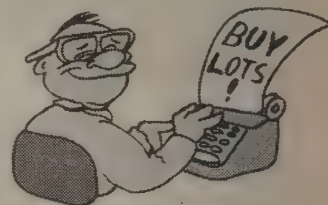
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ATV Network

Message From The President (ATN-CA) (2007)

A year has come and gone since I was elected to the position of president of the California Chapter of the Amateur Television Network. With the new year comes the opportunity to reflect on the events of the last year, and elect a slate of officers for the upcoming year.

As your president for the 2006-2007 year I participated in representing the ATN at the SOARA Field Day, and at the Hamfest in Dayton, OH. I gave ATV demos at the South Orange Amateur Radio Association (SOARA), the West Coast Amateur Radio Club (WCARC), the Orange County Fair, and the ARRL Ham Radio Expo at the Los Angeles County Fair. It has been a lot of work, but it has also been a lot of fun. Thank you all for the opportunity to serve as your president.

The ATN-CA held an election for the positions of president and vice president at the annual ATN winter meeting in Ontario. ATVers that were not able to attend the meeting could still take part in the nomination and voting process by watching the meeting over the ATN Network. As a result of the election, I will be serving another year as the president of the California Chapter of the Amateur Television Network and Allan, W6IST (ATN-CA president for 2005-2006) will serve as vice president. I look forward to working with him this coming year. I would also like to thank all of you who attended the meeting in February and for your vote of confidence.

At the meeting, in addition to electing a president and vice-president, we were updated on the repeater status, received the Secretary/Treasurers report, and gave out one recognition award.

The recognition award this year was called "The Amateur Television Network President's Award, 2006-2007" and was presented (over the air) to Bryon Foster (N6IFU) for "conspicuous contribution to the ATN over and beyond the call of duty". Over the last year, Bryon has had several open houses at his QTH where he demonstrated amateur television. He contacted many ATVers who have been inactive and encouraged them to become active again. He has worked hard to get ATV equipment together with HAMs that have shown an interest in using the equipment and has performed several site surveys for HAMs interested in getting into the ATV mode. He shared in being net control for the Tuesday night ATN net and was always (well almost always) available to provide live ATV demos when ATV was being demonstrated at field Day, club meetings, or the Orange County fair. He also has taken on the task of contacting ATVers and potential ATVers to remind them of upcoming meetings and nets and he keeps track of who checks into the Tuesday night net. He will be taking over as the primary net control for the upcoming year. Please join me in congratulating Bryon on his award and encourage him to keep up the good work.

Several members renewed their membership at the meeting. For those of you that were not able to renew at the meeting or were not able to attend the meeting, you can still send your membership dues to Mike Collis. The dues are still \$50.00. To renew, please make your checks payable to Mike Collis, WA6SVT, our Secretary/ Treasurer. We need to get everyone to renew their membership so that ATN will have sufficient funds to improve our repeater sites. Mike's address is P.O. Box 1594, Crestline, CA 92325. If you are a new member or have changes to your address, call sign, email address, or phone number, please go to the ATN website (<http://atn-tv.org/>) and click on the "Membership Application" link and include that form with your payment.

As I said last year, we all need to continue to work on increasing the Amateur Television Network membership here in Southern California. One way to increase membership is to continue to have more members give presentations on amateur television and the ATN to clubs in their area. Any suggestions you have for demonstrating amateur television or recruiting new members would be appreciated.

Another way to promote the ATN (and help to increase our membership) is by getting more activity on the repeaters. Remember, Hams should be seen, and not just heard!

The ATN's Elmer program continues to be a great way to take someone from a casual interest in amateur television to becoming a participating member of the ATN. Check out the ATN Elmers page on the ATN website for a list of current elmers. If you would like to be an Elmer to help other hams in your area to get started on ATV, please give me your contact information so that I can post it to our website. We now have 8 Elmers. We can always use more. Please volunteer if you are able to do so.

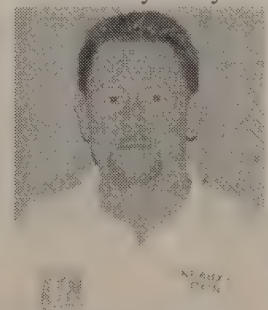
In addition to being the President of the ATN-CA I will continue as the webmaster for the ATN website, so if you have any ideas or suggestions for our website, be sure and let me know.

Once again, I would like to acknowledge that without the technical (and financial) contributions of Mike Collis, (WA6SVT), that the Amateur Television Network as we know it today would probably not exist. All of us that enjoy amateur television, especially here in Southern California owe him a big debt of gratitude.

If any of you want to contact me, my e-mail address is ke6bxt@qsl.net. I would like to hear from you if you have suggestions for our group. You can also contact Daryl, (N6DTO) at n6qpk@n6qpk.com.

73, Don Hill, KE6BXT

ATN-CA President



ATVQ

Amateur Television Contest 2007

Contest period 00:00z 06/01/07 to 00:00z 09/01/07

Contest goal: To raise activity and promote *long haul* contacts on ATV. **This year encourage everyone you see to enter!**

Participants must hold at least a Technician class license and be within the boundaries of North America, Alaska or Hawaii.

In case of multiple Ham occupants, they may share equipment during the contest so long as the intent is not merely to manufacture points. All occupants who enter must submit their own log.

Schedules: The use of schedules is allowed, and can be made by any means available. The use of 144.340 MHz national ATV calling frequency is also allowed and encouraged.

REPEATER CONTACTS DO NOT COUNT. Distance calculations will be between both stations in the QSO with no relay allowed.

Exchange: Callsign with at least P-1 video on any amateur band 70cm and above.

MOBILE or **PORTABLE** stations must exchange their location at the time of contact as determined by portable GPS or other verifiable means.

VIEWER: Station does not have to exchange any video but must be a licensed amateur and confirm at least a P-1 reception report to the transmitting station via 2 meters or another amateur band.

CLASSES: There will be 4 classes for participants:

HOME: Primary location of residence with Fixed Antenna structure. Minimum distance for repeat contacts (75 Miles)

PORTABLE: Station can be set up just for the contest and may not operate from any other location during the contest period. Minimum distance for repeat contacts (50 Miles)

MOBILE: Station can operate stopped or while moving but all antennas must be affixed to the mobile unit and capable of transmitting while in motion. Minimum distance for repeat contacts (25 Miles)

VIEWER: Station must be able to receive video at P-1 signal level and relay report to the transmitting station. Minimum distance for repeat contacts with this class is determined by the transmitting stations type or class.

Scoring System: Each valid contact will be awarded points for the mileage between the two stations on an ever-increasing difficulty per frequency basis as follows:

70cm = 2 points per mile

33cm = 4 points per mile

23cm = 6 points per mile

13cm and above gets 10 points per mile!

A station can be worked for points only once unless they are a minimum distance apart as specified by the class of entry. (See CLASSES) and then they may be worked once in a calendar month through the contest period.

The distance between stations will be calculated by the Maidenhead Grid and sub grid identifier coordinates listed on QRZ.com and rounded down to the nearest mile. Every effort should be made by entrants to verify or update their information before the contest starts. If you do not have Internet to look up a stations coordinates please ask the other station. If they do not know then leave the mileage column blank and it will be determined by the verifier. No changes can be made to coordinates once the contest starts unless you move.

NearSys 06F

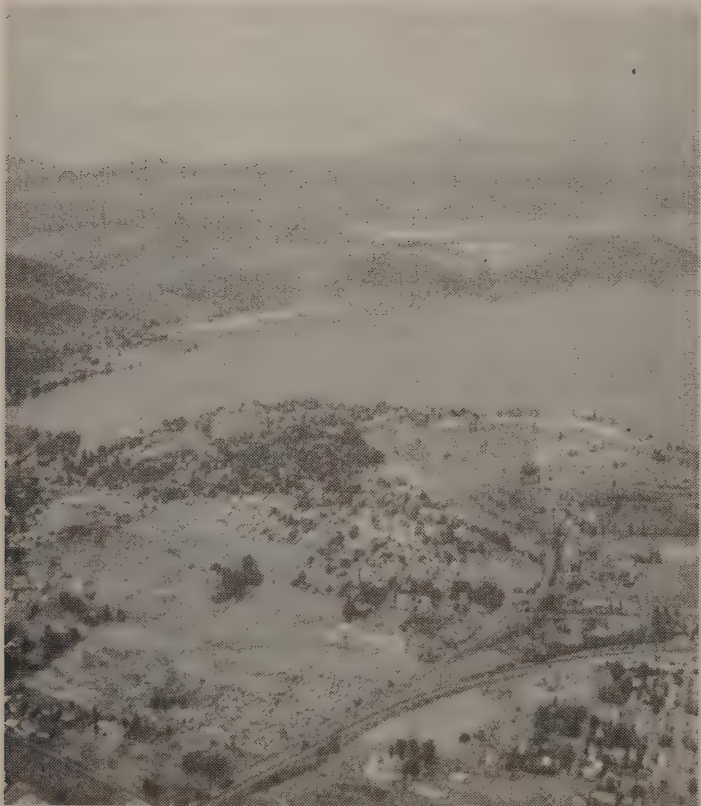
My First Near Space Launch with the Oregon Institute of Technology

By Paul Verhage - KD4STH Email: Paul.Verhage@boiseschools.org

5720 3rd Ave.
Nampa, ID 83686



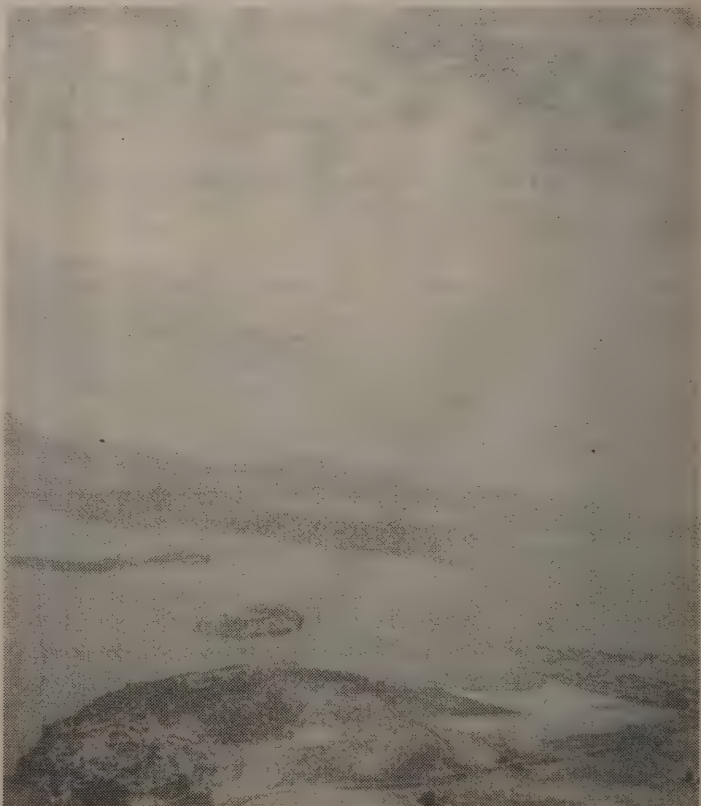
Just after clearing the buildings of the OIT campus, my BalloonSat snapped this picture of Klamath Falls and its lake. There are a lot of lakes in this region of Oregon. Fortunately, we didn't land in one of them.



Right after recovering my near spacecraft at the sixth annual Great Plains Super Launch (see the last issue of ATV Quarterly), I headed back home for my next launch. This was a fast trip home; I only had two days to drive from south central Kansas to south central Oregon, with only the briefest of stops at home. I did make it in time, but just barely. When I arrived at the Oregon Institute of Technology (OIT) on Monday morning, their balloon was filled and nearly ready to launch. Claude Kansaku, an instructor at OIT, gave me some parachute cord and a carabiner and asked me to quickly attach my BalloonSat. I don't think I've ever worked so fast to get a capsule ready for launch.

While getting ready to launch, I learned that OIT flies a single tracking capsule with a primary and backup tracker. The OIT primary tracker is a Kenwood D7 and GPS receiver, a very rugged setup. The D-7 does have a battery lifetime a little shorter than I like, but it's sufficient for a near space mission.

A bit higher and my BalloonSat took this picture. Now we can see further north along Klamath Lake.



The OIT backup tracker is the Raptor Tracker, RI-2C. The tracker is an epoxy encased radio transmitter manufactured by Holohil Systems (<http://holohil.com>). Holohil makes a wide range of animal tracking radios. Some of them are very tiny and designed for small birds and mammals. With their encased battery, they can reliably transmit for a month and are virtually indestructible. You'll see these trackers at high power rocket launches. Their light weight and small volume makes them ideal for rocket trackers.

Along with my BalloonSat, OIT was launching several other BalloonSats designed by Native American high school students from Chiloquin. For them, the launch was the culmination of a summer science program called GRAD (Graduation Really Achieves Dreams). GRAD is geared towards students who are not traditionally college bound and the summer program shows them the benefits of completing high school and going on to college. This year GRAD students spent time at Crater Lake National Park and launched a BalloonSat of their own design and construction.

Before releasing their balloon, OIT did one last check of the tracking capsule. Yep, the APRS laptop showed the capsule located right in front of Purvine Hall. So the count down was given and the balloon released. I hopped into Jamie Zipay's (another OIT instructor) chase vehicle where I was going to do the tracking on his laptop. The software on Jamie's laptop is APRSPoint, a tracking program I've not used before. There's information on this program at the website, <http://aprspoint.com>. As its name implies, it uses Microsoft MapPoint.

It was a perfect launch. But soon we realized we had a problem. The balloon tracker was still showing the near spacecraft at the OIT campus. Apparently the D7 was not updating its position



An example of the terrain we had to search. Fortunately this stretch of forest was at low elevation and pretty small. Further north was Crater Lake, a high elevation location that was dense with trees.

from the GPS. I was gloomy imagining that all the places our BalloonSats and the tracking capsule could land in an area of Oregon loaded with trees and lakes. But the OIT chase crew didn't give up. They had the bird tracker on the near spacecraft and by golly they were going to find it with radio direction finding.

We could detect the Raptor Tracker a couple of hours after launch. So we knew we were close to where it landed. But after taking a few readings we realized the local mountains were reflecting the tracker's signal. Since it's difficult to home in on a signal when you're hearing reflections, there was discussion about using an airplane to get above the terrain. But the cost and delay that would entail convinced us to keep looking.

After a few more hours of searching the GRAD students were running out of time. So they were taken back to OIT while the rest of us remained behind to continue searching for the Raptor Tracker. After another hour of searching we still hadn't found the tracker and thought it best we headed back to OIT ourselves. Once back on the road Claude finally got a chance to check his voicemail, something he couldn't do in the forest.

Claude's first voicemail was from Bruce Snow. He and his family were on their way to Crater Lake National Park when they



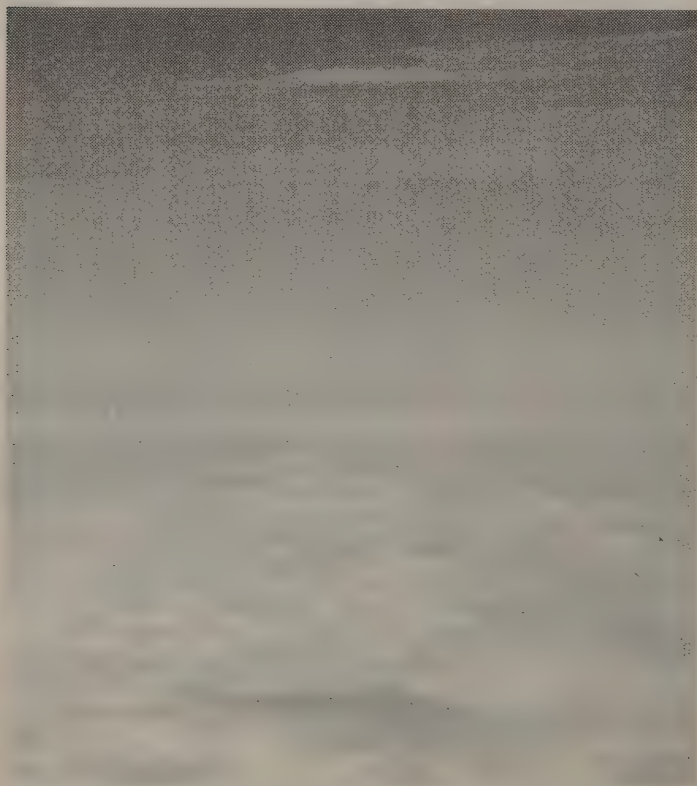
While a little distant from the road, the near spacecraft recovered in a dense forest with no trails and while invisible from the road. Who knows how long it would have taken for someone else to come across it.

stopped to let their dogs out. In the forest around Crater Lake they found the remains of a balloon, parachute, and some boxes hanging off a tree. One of the capsules on the weather balloon has this phone number on it. Bruce and his family were visiting Crater Lake for the afternoon but would return to Klamath Falls later that evening. So he'd try calling back later. Claude tried calling back, but was foiled again by the poor cell phone coverage in this part of Oregon.

Instead of waiting for Mr. Snow to return to Klamath Falls, we drove to Crater Lake to look for him. After all, our stuff was less than one hour away and we had the Raptor Tracker. At the national park I explained to the ranger on duty what we were doing with the radio antenna. Then I turned on the radio. Wow! We had a powerful signal! To our right, and just behind the trees, was the parking lot of Mazama Village. And it appeared the signal was coming from there. We didn't know what Mr. Snow or his car looked like, but we could track him. So upon entering the parking lot we weren't surprised to find a man sitting in the bed of his truck with a parachute, BalloonSats, and the remains of a weather balloon.

We introduced ourselves and explained what we accomplished with the balloon flight. After his family returned from the Mazama Village stores we followed the Snows to where they had discovered the capsules. It's amazing that they came across it, as it was some distance off the main road.

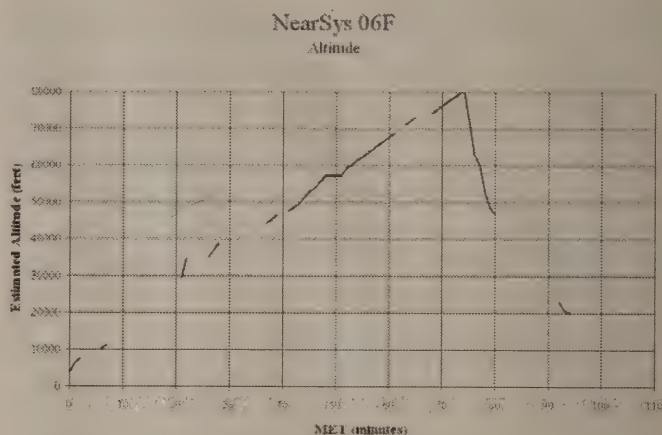
So it all ended well. I got to visit Crater Lake for a few minutes and drive through forests north of Klamath Falls. The digital



We're above the low deck of stratus that built up over Klamath Falls this morning, but below the higher cirrus.

camera in my BalloonSat didn't work as well as some other cameras I own, but I did get a few interesting pictures from this flight.

Since I didn't have APRS data to analyze on this flight, I used the BalloonSat pressure sensor as an altimeter. From that data I was able to generate this chart of altitude. There are lots of gaps in the chart because some of the pressure readings didn't equate to altitude very well.



One of the lessons I learned from the NearSys 06F launch is to check the raw APRS data before liftoff. This is to verify that the GPS has a complete lock, and that we're not seeing just the last latitude and longitude stored in TNC memory. The key is to look at the time field in the GPS sentence. A GPS receiver leaves the time field blank until it gets a lock. Here's an example.

No Lock
\$GPGGA,,4316.1234,W,.....

With a Lock
\$GPGGA,123456,4316.1234,W,.....

Note that there are two commas after \$GPGGA in the first example. That's where the time stamp will be when the GPS has a lock.

I have more near space missions to report on, so keep reading ATV Quarterly. If you'd like to get involved with amateur radio high altitude ballooning, feel free to contact me via email. Also, by the time this article comes out, my near space website should be up and running. Check it out at <http://nearsys.org>.

Onwards and Upwards



The Great Plains Super Launch 2006

By Paul Verhage - KD4STH

Email: Paul.Verhage@boiseschools.org

5720 3rd Ave.

Nampa, ID 83686

The fifth annual Great Plains Super Launch (GPSL) was held in Hutchinson, Kansas, on August 4th and 5th of 2006. Zack Clobes of Project Traveler was the host for the second time, and just like last time, Zack did a bang up job. For me, it was a long road to GPSL 2006.

I began my trip to GPSL by first driving west to Klamath Falls, Oregon. I visited the Oregon Institute of Technology (OIT) to give a short presentation on my BalloonSats. While there, I also arranged to launch my BalloonSat on OIT's next launch; which was in one week. So I'd have to drive to Kansas, visit family and friends, shop at the Cosmosphere, present and launch at GPSL, get home, and then drive back to Klamath Falls. I was going to be a real road warrior after this flight.

Friday's Technical Conference

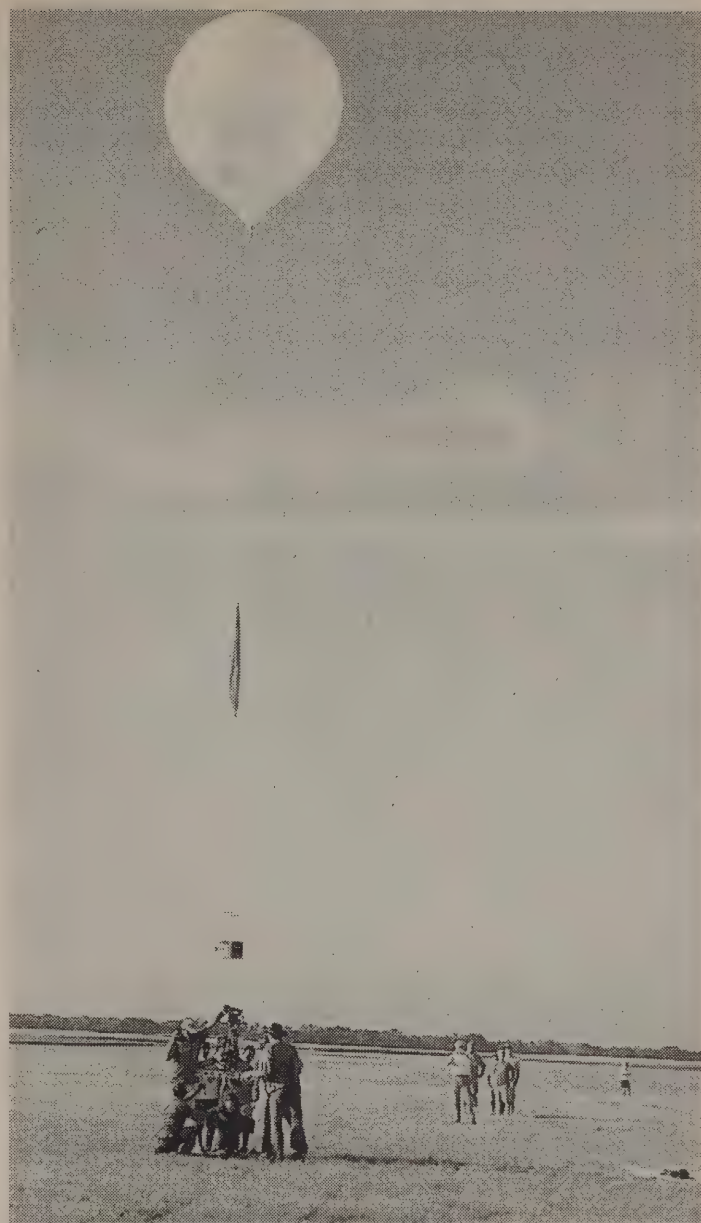
The GPSL 2006 technical session took place at the Prairie Inn conference room. In attendance this year were, Bill Brown the father of amateur radio high altitude ballooning (Alabama), CAPnSPACE (Kansas), EOSS (Colorado), NearSys (Idaho), ORB (Oklahoma), and Taylor University (Indiana).

There were several presentations on topics of interest to the ARHAB community. For example, EOSS discussed a quick release mechanism for burst balloons and CAPnSPACE presented on their new online balloon software. In the back of the conference room, ARHAB groups displayed the latest in their near space toys. Taylor University had one designed after my own heart. Their experiment monitored the pressure inside of a can of Pringles potato chips. At some point in the mission, the can will burst open, sending potato chips earthward. The pressure data collected would indicate when the can burst has occurred. Isn't that neat? Another treat this year was the polyethylene balloons EOSS was able to hand out to GPSL attendees.

My Presentation

My presentation was on BalloonSats. I discussed how I build them and the BalloonSat flight computer I'm currently using. The original BalloonSats, the design developed by the University of Colorado in Boulder, are built with thin foam core and hot glue. Their exterior is usually covered in aluminum duct tape and there's a single load line running through the center of the BalloonSat airframe. The avionics is a Hobo data logger.

I prefer building BalloonSat with 1/2 inch thick Styrofoam, the



kind used to insulate homes, and hot glue. The thicker foam cuts better than Foam Core because it doesn't have a paper covering. And since it's thicker, it keeps the interior of the BalloonSat warmer. I use lighter weight colored tape to cover my airframes and use at least two load lines to suspend the BalloonSat. The additional load lines keep the BalloonSat from swinging around so much.

The BalloonSat flight computer I use is based on a BASIC Stamp 1. Its printed circuit board contains a voltage regulator, an eight-bit digital to analog converter (ADC) for four experiments, and 1 kb of storage for data. Remember that BalloonSats are designed by students for small experiments. They're not tracking capsules that need GPS. Since BalloonSats carry a few experiments at most, they can get by 1 kb of data storage. The ADC has four channels and eight bits of resolution. So the BalloonSat flight computer can collect 1024 measurements during a mission or 256 records from each channel. That enables the flight computer to record data every 350 feet during the

ascent. Of course data is collected less frequently if it's also collected during the descent.

The Friday session ended with a report on Saturday's predicted winds and weather. The predictions dictated that we launch at the Lyons Rice county municipal air port. Afterwards everyone met for dinner at a Hutchinson Mexican restaurant.

My Near Spacecraft

For redundancy, I flew two APRS trackers on my near spacecraft. The most interesting payload was tethered to the bottom. It was a boom-shaped BalloonSat carrying several experiments. The experiments were passive in nature; I just wanted to see what would happen to them in the near vacuum of near space. At one end of the boom was a digital video camera, an AIPTEK fidelity DV5900. At the other end was the camera's target, a bag of potato chips, two balloons, two marshmallows, a vial of red dyed water, and a plastic ribbon. The plastic ribbon was there just to watch how the winds acted on the near spacecraft. The red water was a proof of concept. I wanted to see if the camera would detect water boiling in near space. The marshmallows were observed because they would expand as the air pressure dropped. The two balloons were the canaries in the near space mine. Their expanding volume was an indication to what was happening to the weather balloon. Then there was the bag of chips. Since they were sealed air tight, they would expand during the ascent. Bags of potato chips have burst during my past flights; but the attitude at which they burst was unknown. But on this mission, the world would finally find out. In the hopes these experiments would be interesting enough for an interview, I taped Terry Gross' name and that of her radio show, Fresh Air, all over the VideoSat. To date, Fresh Air has not contacted me about the flight.

Saturday's Launch

I have family in Hutchinson, so I always have a place to stay when Project Traveler hosts GPSL. So Saturday morning I left my cousin's house and drove to Lyons. I only managed to get lost once along the way. I had to smack myself on the head when that happened, because I had a GPS in my car and hadn't bothered to set it up when I left Hutchinson. After powering up the GPS and getting my bearings, I still managed to arrive in Lyons early. I met with a few of the launch teams that were already there and then began setting up my launch equipment. For this mission I teamed up with Dan Miller (KE4SLC), an old friend from my Kansas days. He's helped me launch and recover many balloons in the 1990s. It was nice to meet him again after all these years and to do another near space launch. Zack and Project Traveler arrive shortly after with several tanks of helium.

Even with Dan's help, we were several hands short. But luckily, Mark Conner (N9XTN) had told a Boy Scout troop about the launch. The scout master contacted me the evening before the launch for directions. While on the phone I offered his troop the opportunity to help me launch. And sure enough, they were there and ready to lend a hand Saturday morning.



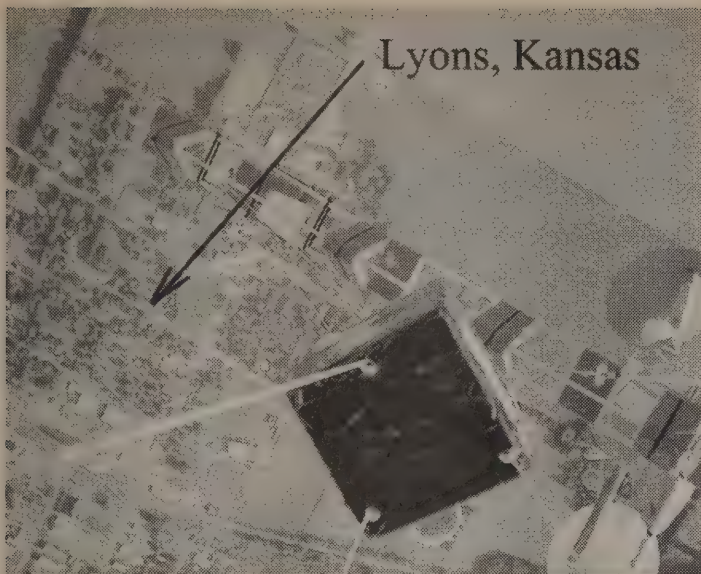
I'm measuring the balloon's lift. When it's at least three pounds greater than the weight of the entire near spacecraft, we'll stop filling and seal the balloon.

I was hoping to be the first to launch, but EOSS, beat me to it. Oh well, it's very tough to beat the best in the business. After launch I was able to give Bill Brown (WB4ELK) a hand launching his balloon.

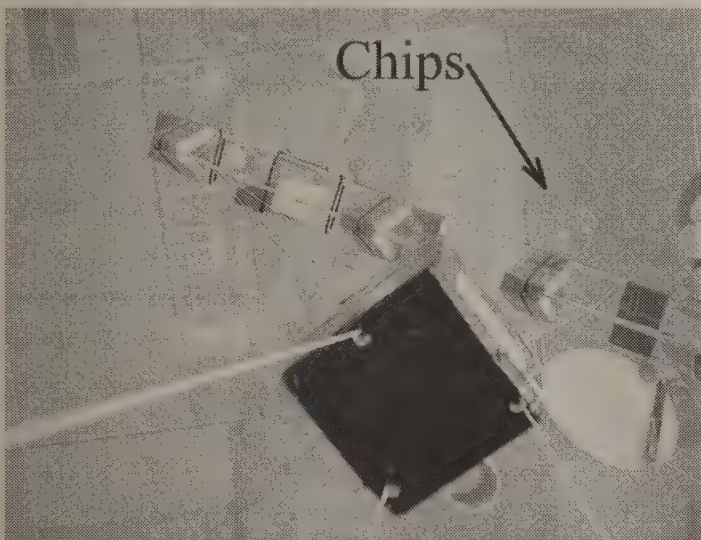


Dan, the scouts, and me watching the near spacecraft climb away.

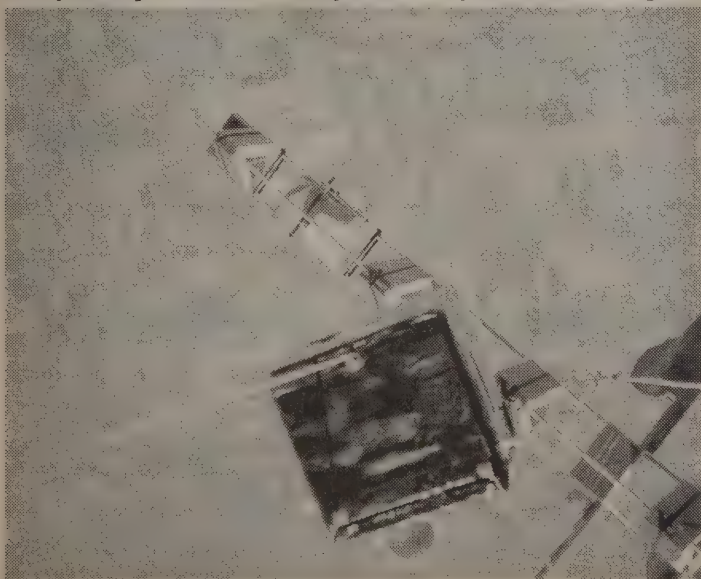
As soon as Bill's balloon was launched, I loaded my chase equipment into Dan's truck and we drove off in pursuit of my near spacecraft. It reached an altitude of 84,700 feet and climbed at an average ascent rate of 1,000 feet per minute. For a flight reaching an altitude of 84,000 feet, the near spacecraft surprisingly only traveled 13 miles. So there was lots of free time that we didn't have to chance the near spacecraft. So our first stop on the chase was the Lyons' DQ. Here are some photographs taken on this mission.



Spying on the good residents of Lyons, Kansas.



Bombs Away! An unsuspecting farm outside of Lyons, Kansas is bombed by an Idaho Cluster Bomb. I hope they were short of potato chips this morning.



When the balloon finally burst we got serious. We didn't have far to go, but we wanted to position ourselves to see the touch-down. Now Dan is the only person who has caught near spacecraft as it was landing. So I know he had the same idea I did, get there early enough to catch the balloon as it landed. Unfortunately, it's difficult to predict exactly which field a near spacecraft will land. Dan and I managed to get close enough to watch it land, but not close enough to run into the field as it landed.



On the ground.

After recovering the near spacecraft we drove back to the airport. I was hoping there would already be near space groups waiting there. But alas, there were only a few people, and some of them were just pilots. Since I had to be back in Klamath Falls, Oregon in two days, I didn't stick around very long at the airport. Just long enough for Dan to download my data and to burn a copy of a DVD. I said thanks to Dan and drove off into the sunset (well, actually, it was just closer to high noon).

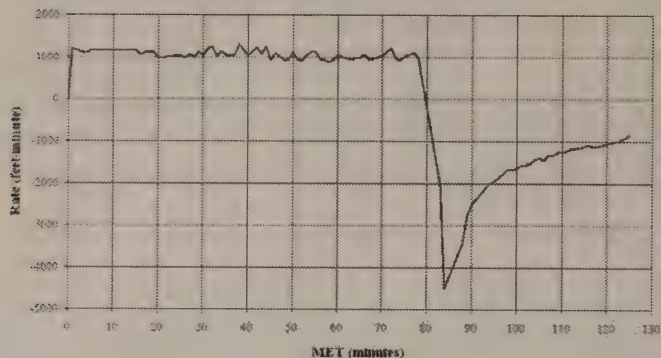


84,000 feet above Lyons, Kansas. Shortly, the balloon will burst and we'll come back home. You'll notice the toy balloons have burst by this time.

Data Collected on NearSys 06E

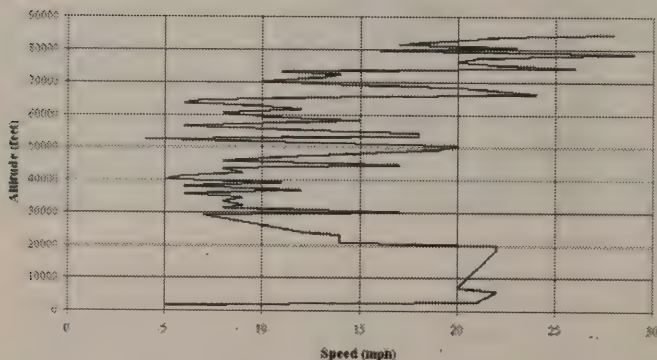
Here are some of the charts I created from this mission.

NearSys 06E
Climb Rate



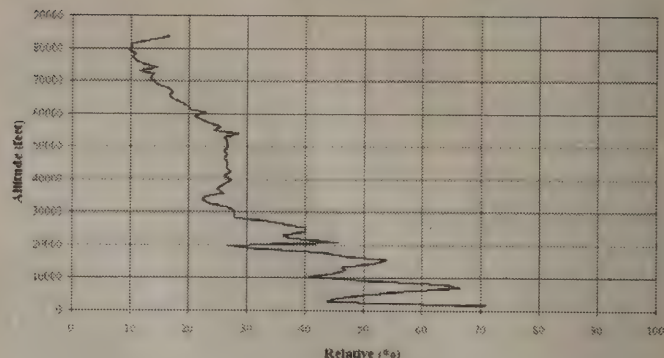
Using altitude and time data from the GPS receiver, I was able to use a spread sheet to calculate how fast the balloon climbed. Notice the ascent rate decreased 20 minutes after launch. That's pretty typical. The balloon descended at close to 60 miles per hour just after the balloon burst. As the near spacecraft descends into denser air, the parachute is more effective at slowing the near spacecraft down. Touch down occurred at a speed of only 9 miles per hour.

NearSys 06E
Winds Aloft



NearSys 06E was launched inside a high pressure system. So the winds aloft were pretty light. But it is a little unusual to find the wind speeds picking up around 70,000 feet. To me that seems more typical of winter and not summer.

NearSys 06E
Relative Humidity



This is more like what I expect to see. It gets very dry in near space.

Well, that was GPSL 2006. Next year this annual event will be hosted by Central Nebraska Near Space Project (CNNSP) in Grand Island, Nebraska. Check out the CNNSP web site at, www.cnnsp.org. If you want to see the balloons fly, then plan to visit GPSL 2007 around the 4th of July weekend.

Onwards and Upwards

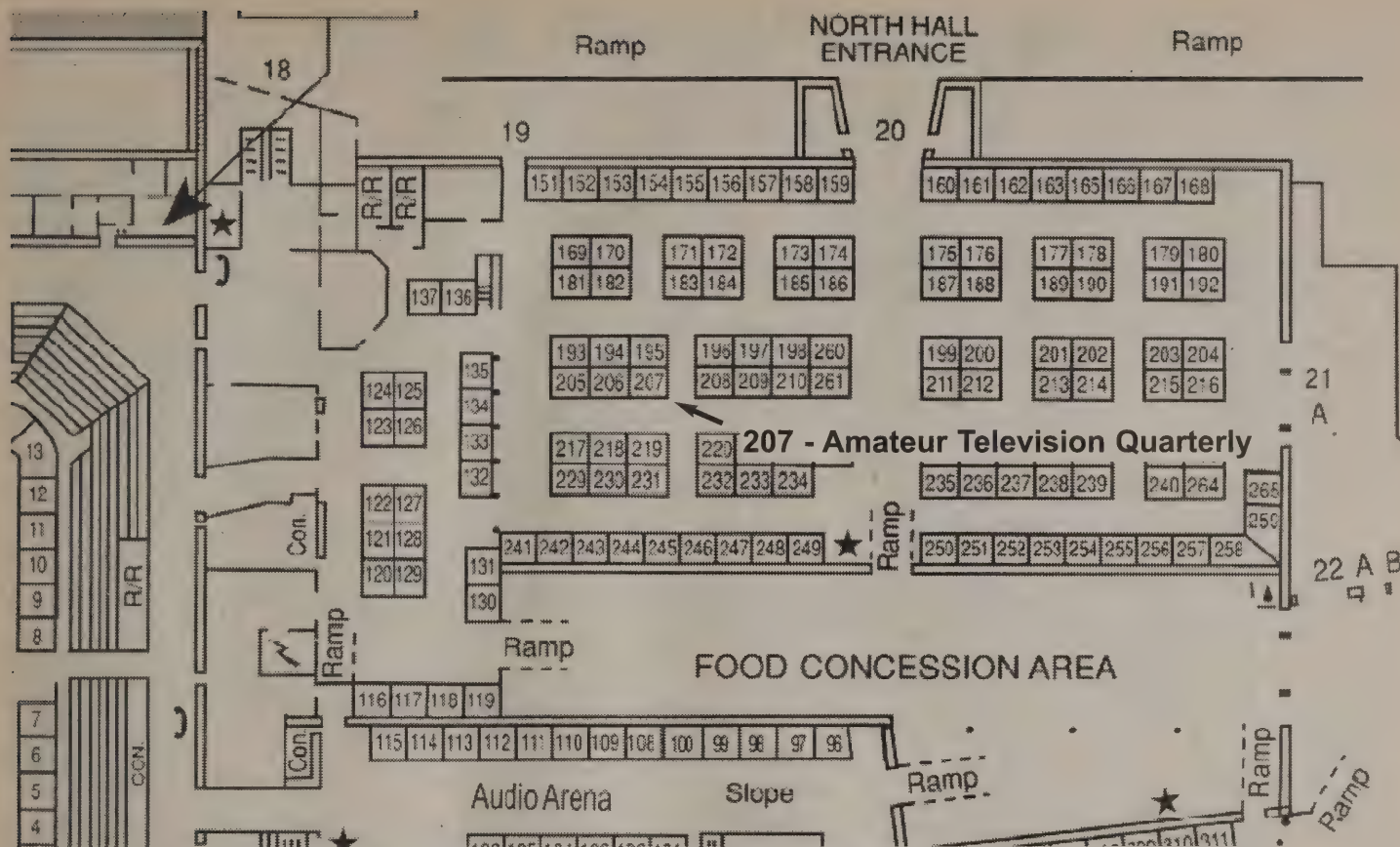
ATVQ

GPSL 2007

Do you live in or planning to visit Nebraska after the Fourth of July holiday. The seventh annual Great Plains Super Launch takes place July 6th and 7th in Grand Island. This year the Central Nebraska Near Space Program (CNNSP) is hosting this near space conference and launch. The event is open to the public, so if you want to learn more about amateur radio high altitude ballooning, this is the event to attend. Get more information at the official website, www.superlaunch.org.

ATVQ

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Find Waldo - I mean the ATVQ booth - Hint #207 as last year

International Visual Communication Association (IVCA)

Friday Night IVCA SSTV Meeting

7 p. m. Friday, May 18, 2007

Best Western Executive Hotel, 2401 Needmore Road, Dayton, OH 45414 Phone: 937-275-5039

Program Chairman: Dave Jones, KB4YZ:

Speakers: TBA Talks will cover: new software programs, comparison of SSTV systems, better and innovative uses of SSTV, SSTV web pages and much more.

Contact Dave Jones, KB4YZ, if you would like to speak to the group on any SSTV related subject. (djones@tima.com). There will be a general election of officers. Come prepared to nominate names for the election. For additions, changes, or corrections, contact Dave Jones, KB4YZ, (IVCA President) at 812-834-5156 or at djones@tima.com.

3:00 p.m. - 4:45 p.m. SLOW SCAN TV (SSTV)

Saturday Room 3

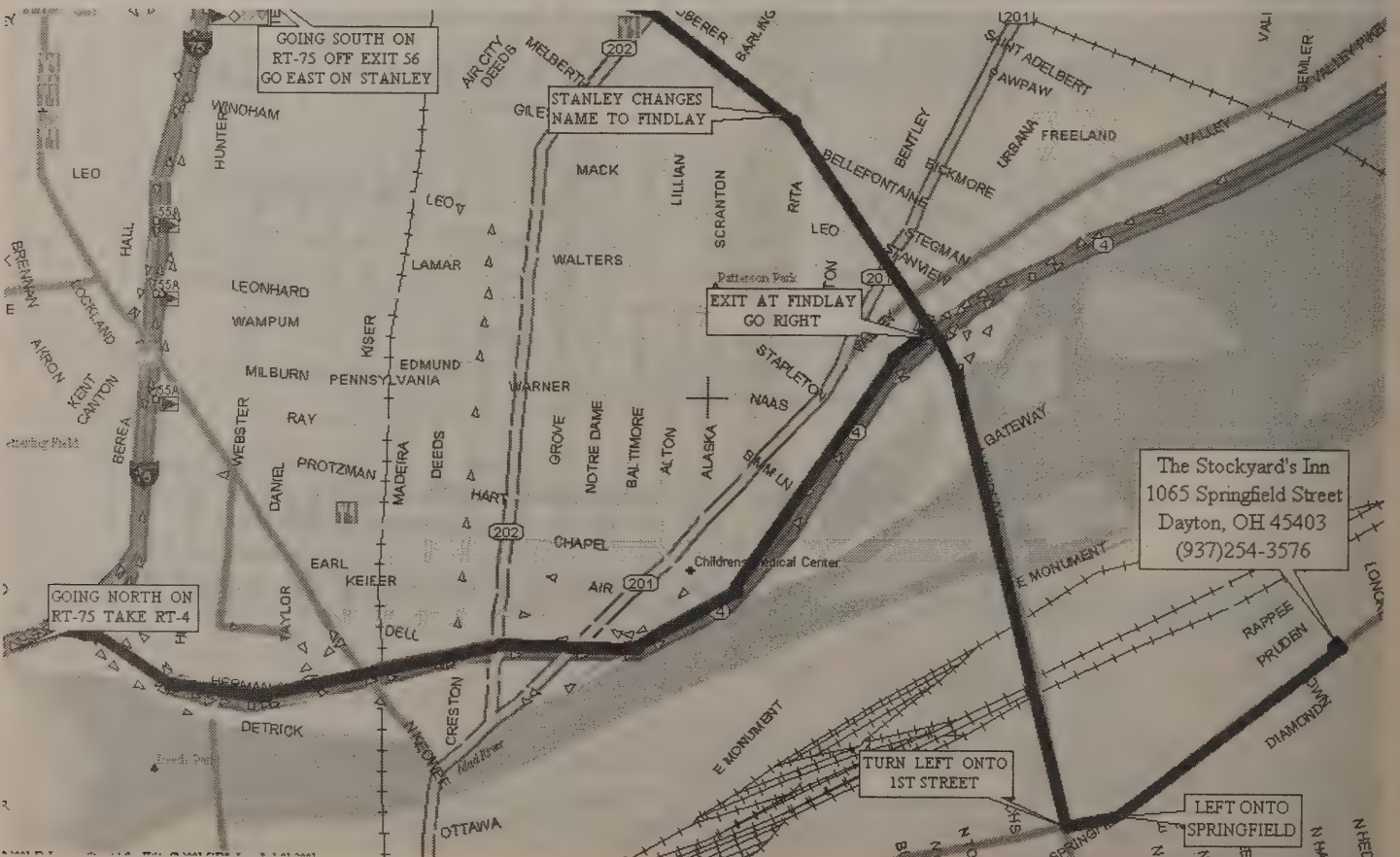
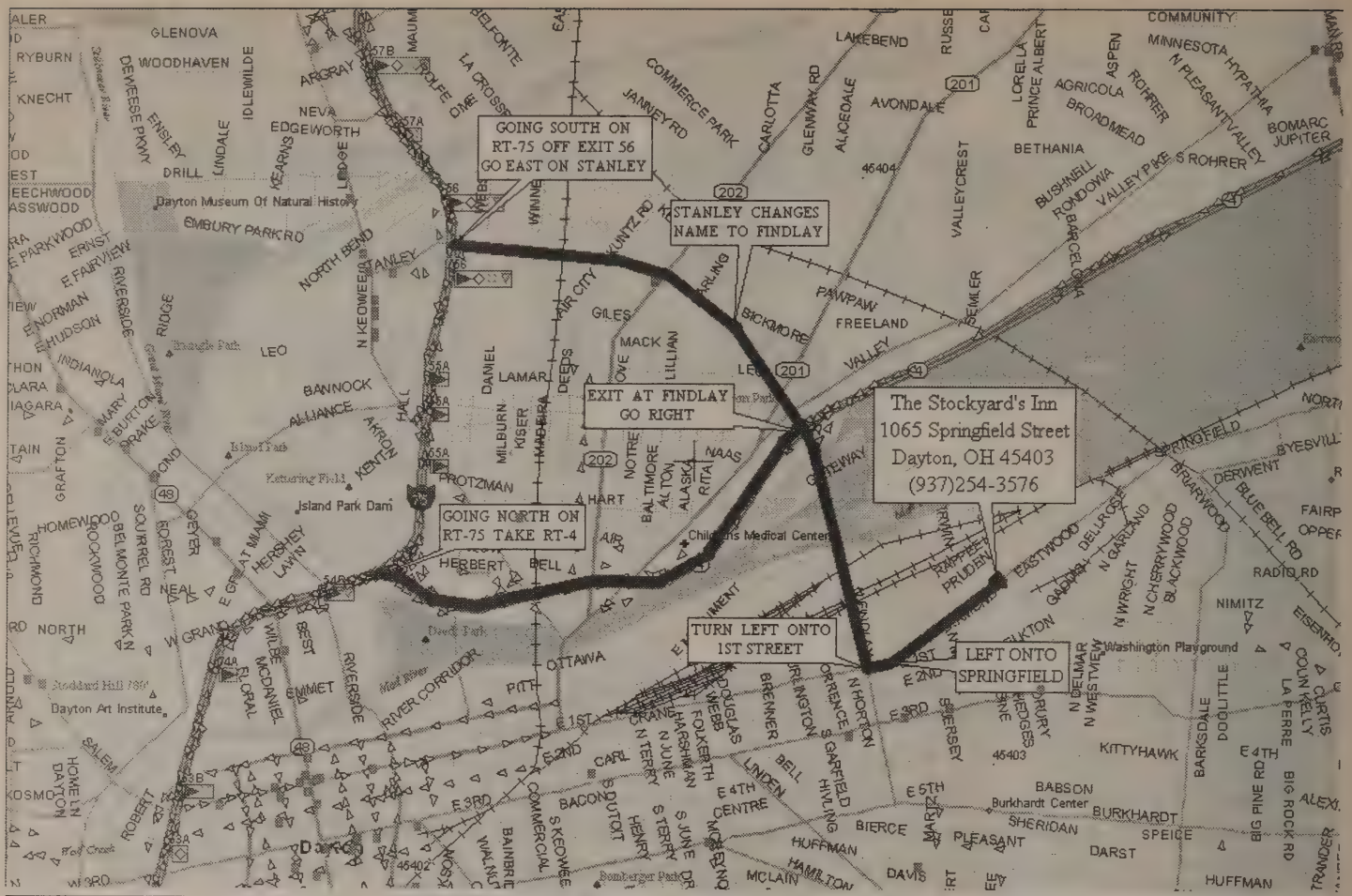
Moderator: Don Miller, W9NTP

Speakers; Mel Whitten, K0PFX-FlexRadio and DRM (Digtrix, Digital Slow Scan Television)

Lew McFadin, W5DID-SuitSat 2, Not the Same Suit. This is the second chapter of a great SSTV Space Experiment.

Dave Jones, KB4YZ-Operating Digital radio Mondiale (DRM) with EasyPal Lite Software

ATVQ



Friday Night ATV Dinner

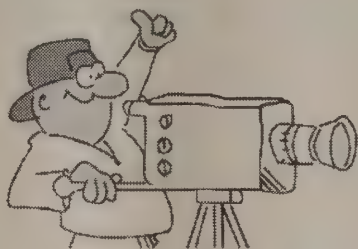
May 18, 2007

Art Towslee, WA8RMC, has announced the Dayton weekend activities regarding Friday night ATV sessions. This year we will be back at "The Stockyards Inn", for the Friday night session. This will enable ATV'ers and guests to enjoy a moderately priced meal and also allow more time for technical presentations. The Stockyards Inn will provide separate checks as we order from the menu. There will be door prize drawings throughout the evening.

The Location:

Stockyards Inn
1065 Springfield St.
Dayton, OH 45403
Phone 937-254-3576

Starting at 6PM



DIRECTIONS

From I-75 North, Exit 56, Stanley Avenue East, at RT-4 the road changes name to N. Findlay Street, at First Street turn left and the road will then merge into Springfield Street. Look for "The Stockyards Inn" on your left. The trip from I-75 is 3.4 miles and should take about 8 minutes.

From I-75 South, Exit onto SR-4 and get off at N. Findlay Street South. At First Street turn left and the road will then merge into Springfield Street. Look for "The Stockyards Inn" on your left. The trip from I-75 is 4.0 miles and should take about 6 minutes.

Please note: Each person will be responsible for their own dinner expenses.

ATVQ

Hamvention ATV Forum 2007

Saturday May 19, 2007 - Starts at 11:45 AM

This year we have our regular time slot back for the ATV forum and it will be in room #2. This is the line-up of speakers as we know as we go to press.

11:45 to 11:50

WA8RMC, Art Towslee "Welcome and Introductions"

11:50 to 12:05

K3ZKO, Ron Cohen "Getting Started in Amateur Television"

12:10 to 12:25

WB9MMM, Gene Harlan "Emergency Communications Using ATV - The Possibilities"

12:30 to 12:45

WA6SVT, Mike Collis "Linking ATV Repeaters"

12:50 to 1:05

WB8ELK, Bill Brown "Airborn ATV"

1:10 to 1:15

WA8HFK, Frank Amore "ATCO Picture Slide Show"

1:20 to 1:45

AA9XW, Henry Ruh "Some Bits about TV Bytes"

Art Towslee - WA8RMC
ATV forum chairman

Plans For 20th Anniversary ARHAB Celebration In Findlay, OH

I've starting to work out the details for the 20th anniversary of my first flight. I am currently planning on holding it the morning of Saturday, August 11th, 2007 from a farm near Findlay, OH, probably the same location as my first flight at WA8HDX's QTH.

I would like to invite any balloon group to come fly at this event ala a GPSL style multiple launch and recovery.

I'm just in the planning stages of the event now and would like a quick show of hands of those who are thinking of attending or flying that day. I can do a group purchase of helium to make it as reasonable as possible.

That part of Ohio is ideal for flight and recovery, mostly perfectly flat farmground with few trees.

I'll announce more details as we get nearer to the date on my website: <http://www.wb8elk.com>

73s de Bill WB8ELK
wb8elk@aol.com

ATVQ

Multilabs Releases New VGA Controller and Serial Module Products

Multilabs is pleased to announce their two newest products: The ezVGA Graphics Controller and ezVGA Serial Module.

The ezVGA Graphics Controller is an embedded graphics controller that can be interfaced to any design via an 8-bit data bus and 4 addressable control lines. Through the ezVGA Graphics Controller your embedded controller or processor can easily generate color VGA graphics. It provides all the circuitry necessary for a host interface, video memory control, and generating color VGA graphics with high screen resolution.

The ezVGA Serial Module takes it one step further. It uses the ezVGA graphics controller and with the use of an on-board microcontroller scales high-resolution color VGA graphics down to 2 serial communication lines and a handful of graphics and text commands. This makes the ezVGA Serial Module a ready to use serial controlled VGA video card that will deliver VGA functionality to your design. The 9 easy to learn commands gives any embedded controller or processor the ability to draw high resolution color VGA text and graphics.

Datasheets, user manuals, application notes, source code, sample screen shots, and more for these new products can be found on our website at www.multilabs.net. Please stop by and take a look and if you have any questions please feel free to contact us.

Best Regards, Multilabs Support

ATVQ

US Antenna Maker Cushcraft Sold

Waltham's Polaris Venture Partners reports that Manchester, N.H.-based Cushcraft Corp. has been acquired for \$89.75 million by the United Kingdom-based Laird Group PLC, an electronics, security systems and distribution group.

The Cushcraft business and its management will be integrated with St. Louis-based Laird Technologies, company officials said.

Cushcraft, which operates facilities in San Diego and Bluffdale, Utah, is a supplier of antenna products for the wireless networking and communication industry.

Polaris officials said the firm took a majority interest in Cushcraft in September 2003. The sale is the second portfolio company exit in a month for Polaris. It follows the recent acquisition of Waltham's Archivas Inc. by Hitachi Data Systems Corp., a division of Hitachi Ltd., for \$120 million.

Cushcraft Corporation
<http://www.cushcraft.com/>

Laird Group PLC
<http://www.laird-plc.com/>

Laird Technologies
<http://www.lairdtech.com/>

Laird Technologies Acquires Cushcraft
<http://www.lairdtech.com/downloads/cushcraftexternalannouncement.pdf>

ATVQ

BATS Mailing List

Recently it was discovered that the BATS mailing list server was gone. Our ISP lost it and could not retrieve it from backups. The list server is now running again, but with a "clean slate" Therefore everyone will need to subscribe to the list again. I have emailed everyone that I could think of that was on the list, but I know there were some on the list that I have missed. So spread the word to any that might have been missed, that they should re-subscribe to the list.

To subscribe to the list in the feed mode (where you get sent emails as they happen) send any email to BATS-feed@shop-stop.net. To subscribe to the list in the digest mode (where daily complications of the emails are sent) send any email to BATS-digest@shopstop.net. The list manager will then automatically send you an email to which you will need to respond to complete your subscription - just follow the instructions. Once you are subscribed, sending an email to BATS@shopstp.net will send that email to all on the list. Instructions also can be found on the BATS website: www.shopstop.net/BATS.

Sign up soon as I think Joe has some balloon plans in the works!

ATVQ



P. C. Electronics 2522 Paxson Lane Arcadia CA 91007-8537 USA

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Tel: 1-626-447-4565 m-th 8am-5:30pm pst (UTC - 8) Tom (W6ORG) & Mary Ann (WB6YSS)

24 hr FAX order line 1-626-447-0489

Web site: www.hamtv.com



GVM-1 Board Applications

This board has many other uses, with only slight modification, besides video modulating a Gunnplexer.

FM ATV Receive Video Amp - Boost the low video output to 1V peak to peak from an analog satellite TV receiver by clipping out the input pre-emphasis 20 Ohm resistor (marked with an X) and replacing the 270 Ohm with a jumper on this board. Analog satellite TV runs 11 MHz deviation and ATV uses 4 MHz deviation on the 900 and 1200 MHz ham bands. So a gain of almost 3 is required to properly drive a video monitor for ATV. Some receivers have a video gain pot inside but still don't quite make it. This board has an adjustable gain of up to 5.

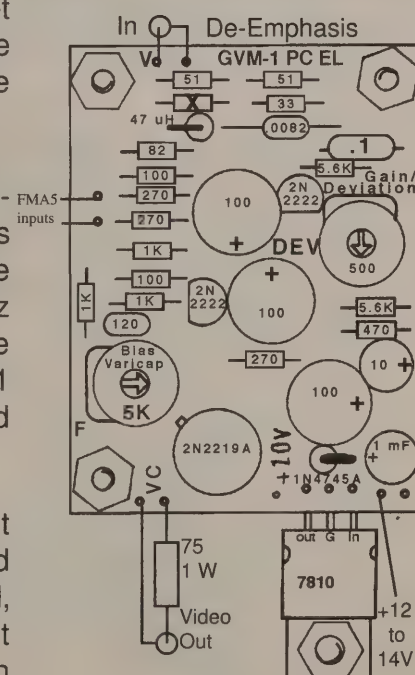
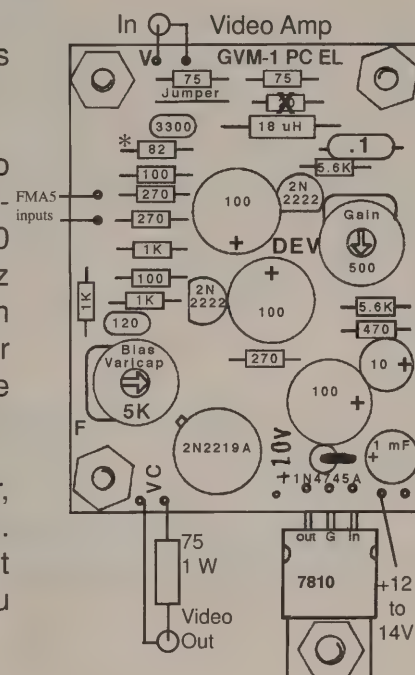
Video Distribution Amp - You can drive a 2nd monitor, VCR, transmitter, etc., by tapping into a video line without loading it down with this board. Clip out the input pre-emphasis 20 Ohm resistor, * 82 Ohm input termination resistor, 270 Ohm resistor and add the jumper. In fact, you can add 2 or 3 modified GVM-1 boards in the DA configuration.

Add Sound Subcarrier - There are two inputs that can mix FM sound subcarriers to any video line going to an ATV transmitter that does not have sound. The FMA5-G sound subcarrier board(s) output can be connected to the solder pads on the GVM-1 board to be mixed in with the video.

Pre-emphasis and De-emphasis - FM satellite receivers have de-emphasis built in to the video output. However, most all FM video receivers made for wireless security camera systems do not. Pre-emphasis in the transmitter and corresponding de-emphasis in the receiver running 4 MHz deviation can gain twice the distance by lowering the noise floor. The stock GVM-1 can be used as is with the transmitter and another GVM-1 with the 5 pre-emphasis parts replaced with the de-emphasis parts and one removed as shown at the top side of the board on the right.

When not used to also bias a Gunnplexer diode, the 5K varicap bias pot should first be set to give 2.0 Vdc at the VC video output when connected to a 75 Ohm resistive load. Also, to limit the current if accidentally grounded, the 75 Ohm 1 Watt resistor is run from the VC solder pad to the video out jack or video out cable. The 5K Deviation pot becomes the video gain pot for setting the output to 1 Vp-p into the resistive 75 Ohm termination in your monitor, VCR or transmitter.

The GVM-1 board is available from P. C. Electronics for \$29 each or \$25 each in quantity.



W6ORG©3/2007

Payment for Technical Articles

ATVQ will pay for certain articles that it publishes. I will outline the policy here, but it will be subject to change as needed to make sure that ATVQ continues to be an ongoing publication. ATVQ will pay \$25.00 for technical articles that are published and are a minimum of 2 pages. While this is not a great amount, I hope it will encourage more technical type articles to be written. Exceptions will be articles that are written by a manufacturer/seller of equipment that is being written about. While I do not want to discourage this type of article, the article itself is an advertisement of the product. Articles from clubs will be encouraged, and I would expect they would like to share their information with the ATVQ readership. Information gathered from the Internet will not be paid for and is mostly small filler items.

Ideas

Do you have an idea for an article that you've said to yourself that you wanted to write, but never did. Feel free to check with us to see if it is of interest, or write and send it in. No guarantees that it will get published, but if you don't try, you will never know. I'll be looking to see what you can do!

Preferred method of receiving articles is from **Microsoft Word**, however **Wordperfect** is OK too. Next preference would be **ASCII text**, followed by **typewritten** or **hand written** (clearly). Diagrams or pictures (B&W or Color) can be sent in hard copy, or if you scan them in, save to PCX or JPG formats (actually I can read about anything). If you send a computer disk, make sure it is PC (not MAC) format.

When sending in articles in Microsoft Word, please SAVE with FASTSAVE OFF and save in Word 6 format. Also, articles written in any word processor, consider what will happen when it is re-formatted to fit the style that I might put it in. An example would be setting up tables or adding figures into the article. They can be very hard to strip out. If possible, put the tables, figures, each in a file by itself. This will help me to be able to import into the magazine format.

Articles can be sent to:

ATVQ, 5931 Alma Dr., Rockford, IL 61108

or to our email address: atvq@hampubs.com

Also note our web page address: <http://www.hampubs.com>

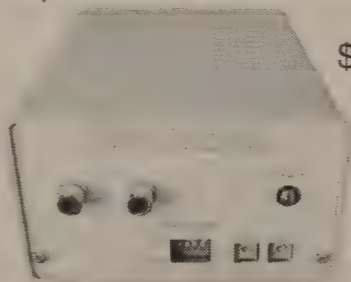
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High quality ATV transmitters by Videolynx

Model Z23B

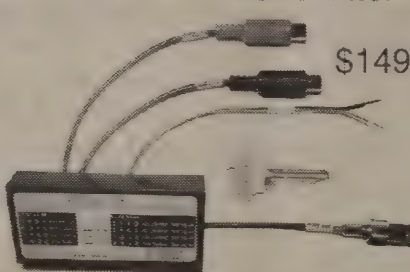
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Burnaby, BC Canada V5C 2J5

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Mounds View, MN 55112

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will contact them.

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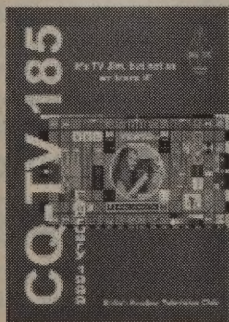
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Videolynx	40

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Amateur Television Quarterly!**

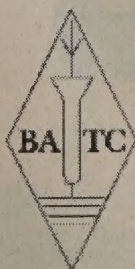
ATVQ on the Newsstands

If you find a store willing to carry ATVQ on their shelves, we will extend your subscription by one year. In the case that two people turn in the same store, the first one wins! Offer subject to change at any time, but not likely to!

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50

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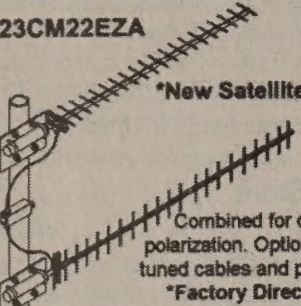
M
YOUR ATV AND
SATELLITE ANTENNA
SOURCE...

***New ATV 432 Package**
Completely redesigned for the ATV
frequencies. Perfect match, 8.4 dBd
of gain over ground.
Factory Direct Only



23CM22EZA

***New Satellite Array**

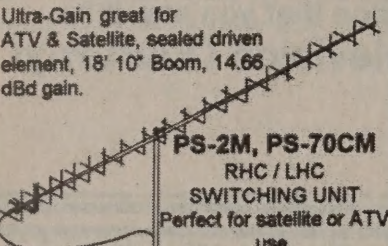


Combined for circular
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Factory Direct Only

436CP42UG

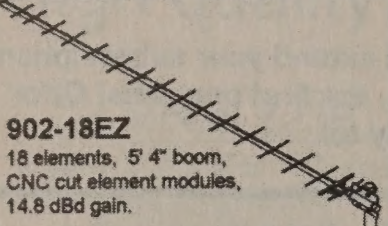
Ultra-Gain great for
ATV & Satellite, sealed driven
element, 18' 10" Boom, 14.66
dBd gain.

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Perfect for satellite or ATV
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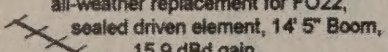
902-18EZ

18 elements, 5' 4" boom,
CNC cut element modules,
14.8 dBd gain.

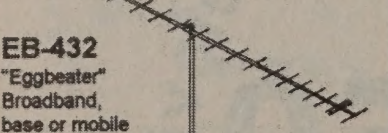



440-21ATV

all-weather replacement for FO22,
sealed driven element, 14' 5" Boom,
15.9 dBd gain.



EB-432
"Eggbeater"
Broadband,
base or mobile

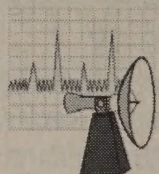
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Miniature Color TV Transmitters

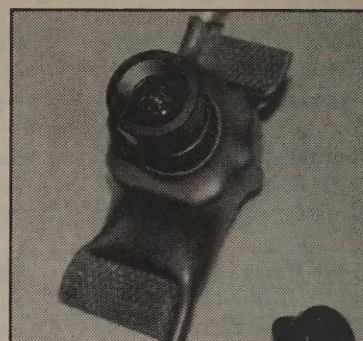
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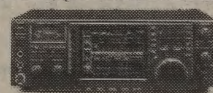
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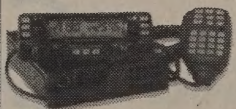
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IC-V82
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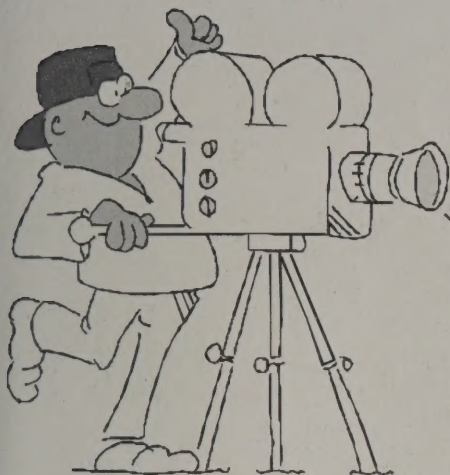
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Please call TODAY!

Gene Harlan - WB9MMM - Editor/Publisher

RESERVE YOUR SPACE TODAY!

1-815-398-2683 - voice

1-815-398-2688 - fax

AD RATES

Effective November 19, 2004

INSERTIONS PER YEAR

SIZE	1-3	4 up
FULL PAGE COLOR	\$650	\$500
FULL PAGE B&W	\$160	\$140
ADDITIONAL COLORS/PAGE	\$100	\$100
1/2 PAGE B&W H or V	\$110	\$80
1/4 PAGE B&W H or V	\$85	\$55
1/6 PAGE B&W H or V	\$55	\$38

Multi-page ads are billed at the combined rate based on frequency.

Covers are reserved for COLOR ads.

All typesetting and layout charges for non-camera ready ads will be added.

Covers II, III, IV \$30 extra.

If negatives are not provided for color ads, add \$50.

DEADLINES

COVER DATE	COPY DEADLINE	TO PRINTER	MAILING DATE
WINTER	JANUARY 1	JANUARY 15	FEBRUARY 1
SPRING	APRIL 1	APRIL 15	MAY 1
SUMMER	JULY 1	JULY 15	AUGUST 1
FALL	OCTOBER 1	OCTOBER 15	NOVEMBER 1

While we will try to adhere as close as possible to the above dates, we reserve the right to adjust as needed.

If material is going to be late, please call to check if it will meet our schedule. We will try to accommodate everyone as best as we can.

Camera ready art or negative film right reading down is acceptable.

Trim Size: 8 1/2 x 10 7/8
Bleed Size: 1/8" beyond trim
Live matter: 1/4" within border

Harlan Technologies reserves the right to reject any advertising which is not in keeping with the publishers standards. Previous acceptance of any ad will not prevent Harlan Technologies from exercising the right to refuse the same advertisement in the future. Advertising orders are subject to the terms on the current rate card. Advertisers

assume all responsibility and liability for any claims arising from advertisements and will protect the publisher from same.

Harlan Technologies will position ads in ATVQ at its discretion except in the case of preferred positions specifically covered by contract or agreement.

If, for any reason, the publisher fails to publish an advertisement, it will not be liable for any costs or damages, including direct or consequential damages.

Terms: All accounts not pre-paid are billed net 30 days. All accounts over 30 days are billed at 1 1/2% per month. Prompt payment is always appreciated.

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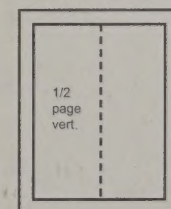
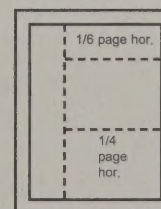
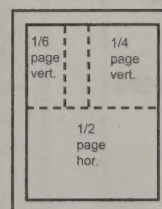
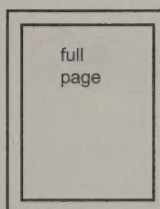
AD SIZES

VERTICAL

	Width	Height
FULL PAGE	7"	10"
1/2 PAGE	3 1/2"	10"
1/4 PAGE	3 1/2"	5"
1/6 PAGE	2 1/4"	5"

HORIZONTAL

	Width	Height
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1/2 PAGE	7"	5"
1/4 PAGE	5"	3 1/2"
1/6 PAGE	5"	2 1/4"



Amateur Television Quarterly

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